Advance online publication https://doi.org/10.5204/lthj.4306

The Right to Repair: A Systematic Quantitative Literature Review

Yuri Banens
Griffith University, Australia

Abstract

In recent years the 'Right to Repair' (RTR) campaign has sought to protect consumers' ability to maintain and repair the goods that they buy. The campaign is a response to mounting legal and technical restrictions placed on parts, information, access and repair of goods by manufacturers. Policymakers have begun to respond to the campaign in various jurisdictions, which has in turn spurred an increasing volume of academic analysis. The RTR field is difficult to neatly categorise however: it cuts across intellectual property, consumer and competition law, environmental sustainability, industrial design, and information technology. The spread of academic publications in the field reflects this diversity. This article presents a systematic quantitative literature review of RTR literature starting from the year 2012. It finds that in the United States, RTR literature has tended to frame it as a problem of consumer and competition law, aggravated by over-broad intellectual property protections. As the conversation made its way to Europe, these consumer protection concerns became more connected with e-waste and sustainability, while IP and competition concerns became less prominent. The reviewed literature focuses strongly on the effects of digitalisation and software mediation of control, especially the effects of anti-circumvention laws and restrictive software licenses on repair. Industries such as automobiles and agriculture have received significant attention from advocates and scholars but critical sectors like medical devices and assistive technologies remain understudied.

***Keywords**:* Right to repair; copyright; software; internet of things; medical devices; assistive technology.

1. Introduction

In a range of industries, from cars to agricultural equipment to consumer electronics to military equipment to medical devices, consumers' ability to understand, maintain and repair their goods has become increasingly restricted. A potent mix of product complexity, repair-resistant design, expansive intellectual property (IP) rights and restrictive end-user licenses has combined to restrict and foreclose the possibility of independent repair. The consequences are higher repair costs, restricted consumer choice, inhibited aftermarket competition, and increased waste through the premature disposal of goods. In the medical devices industry, the list may be extended to include delayed procedures, device unavailability, and limitations on the ability of powered wheelchair users to engage in society.[1] The 'Right to Repair' (RTR) campaign has arisen in response to these mounting restrictions, seeking to ensure that consumers can have their devices repaired at a competitive price by a repairer of their choice.[2] Put in more systemic terms, this means 'rebalanc[ing] the relationship between global and national manufacturers … and the customers who buy [their] goods.'[3]

The campaign has its origins in US consumer advocacy and antitrust law[4] and has spread internationally in recent years. Regulatory responses to the campaign have varied across jurisdictions (see Figure 1). Some US states have introduced parts

[1] Australian Productivity Commission, Right to Repair, 144.
[2] Australian Productivity Commission, Right to Repair, 2.
[3] Wiseman, "Submission No 105 to Productivity Commission," 3.
[4] GPC Asia Pacific, "The History of Right to Repair."

and information guarantees for certain products,[5] and repair-related exemptions to anti-circumvention laws are active at the US federal level.[6] Canada has introduced similar repair and interoperability exemptions to its copyright law's anti-circumvention provisions.[7] The EU requires that consumers are given information about product durability and repairability[8] and manufacturers must offer parts and repair services for a reasonable time after sale.[9] In Australia, a mandatory automotive service and repair information sharing scheme was introduced in 2021.[10] In its 2021 final report on the Right to Repair,[11] Australia's Productivity Commission (PC) recommended several additional changes, most which are yet to be enacted.[12]

This study aims to systematically collate and examine the RTR literature as it currently stands. It seeks to answer the following question: What does systematic analysis of the RTR literature from 2012-2024 reveal about research priorities and gaps, particularly in sectors characterised by technological and regulatory complexity, such as medical devices and assistive technology? By identifying how major themes have emerged in the RTR literature, especially its response to the process of digitalisation, it is hoped that some insight can be gained into which sectors get scholarly attention and why. The medical device industry presents a useful case study since it exemplifies several of the broader tensions in RTR: a concentrated market, rapid product digitalisation, complex regulatory environments, and quality and safety concerns over independent repair. Finally, given the increasing calls for a medical right to repair,[13] this study seeks to illuminate some gaps in the RTR literature with respect to medical devices and assistive technology.

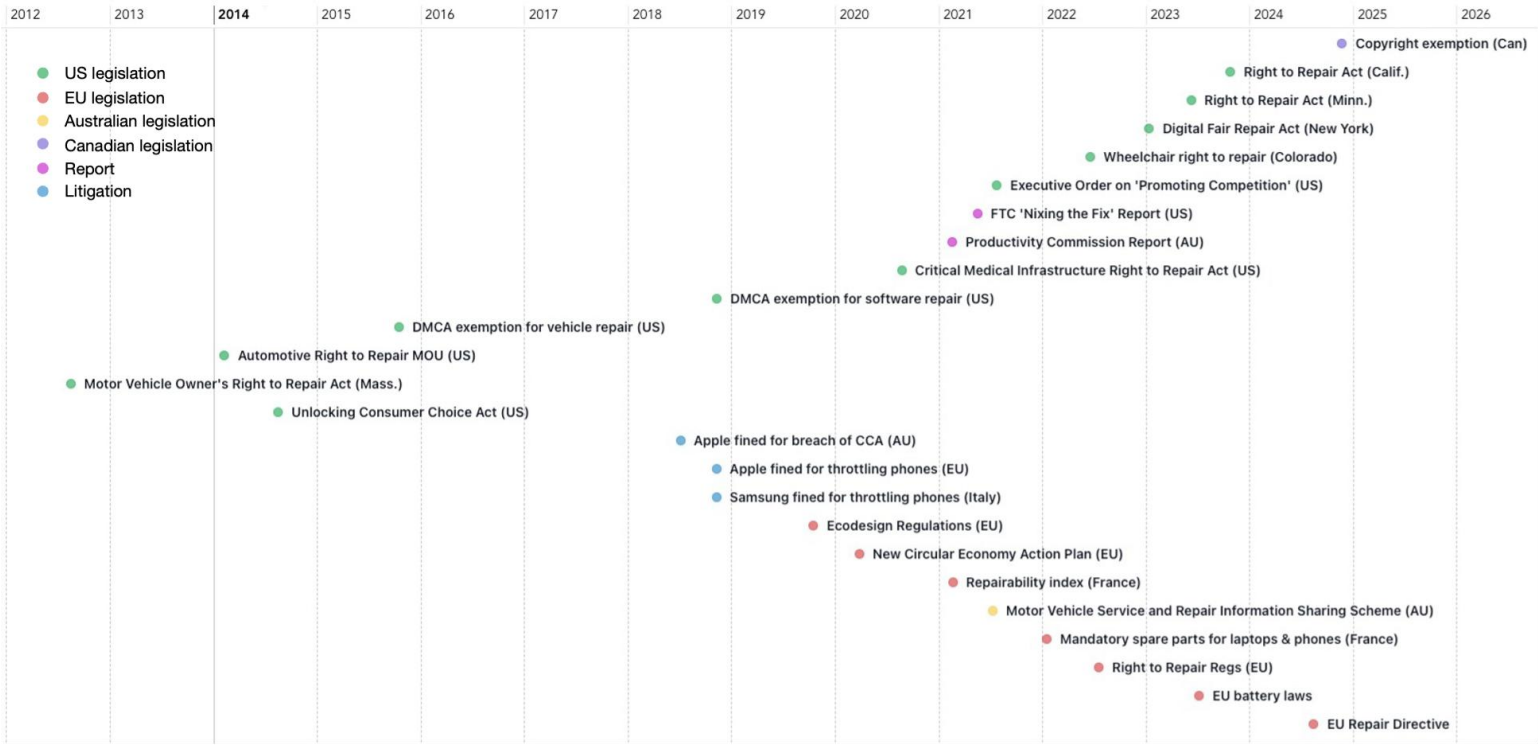

Figure 1: Timeline of selected international reports and policy changes

[5] See Digital Right to Repair Coalition (Repair.org), "Our Mission and History" for an up-to-date list.
[6] *Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies*, 86 Fed Reg 59627 (2021).
[7] Bill C-244, *An Act to Amend the Copyright Act (Diagnosis, Maintenance and Repair)*, 1st Sess, 44th Parl; Bill C-294, *An Act to Amend the Copyright Act (Interoperability)*, 1st Sess, 44th Parl.
[8] European Commission, "Circular Economy Action Plan."
[9] European Commission, "Right to Repair Directive."
[10] *Competition and Consumer Amendment (Motor Vehicle Service and Repair Information Sharing Scheme) Act 2021* (Cth).
[11] Australian Productivity Commission, Right to Repair.
[12] A 'super complaints' mechanism, meant to address systemic issues related to consumer guarantees, commenced in 2024. Australian Competition and Consumer Commission, "Designated Complaints."
[13] Rimmer, "Medical Right to Repair"; Lindgren, "Software-Dependent Medical Devices"; Wiseman, "Restoring Human Dignity."

2. Method

This literature review follows a systematic quantitative method[14] as outlined by Catherine Pickering and Jason Byrne in 2014.[15] The inclusion and exclusion criteria for this review were designed to ensure it contained only peer-reviewed journal articles. Books, book chapters and conference papers were excluded. Grey literature (such as news reports, white papers, policy documents and departmental reports) was also excluded. Databases were selected to obtain as broad a selection of journals as possible, with some selected to emphasise legal sources. Scopus was selected for its comprehensive downloadable metadata. HeinOnline was selected because of its broad coverage of US law journals. Westlaw Australia was included to ensure that Australian law journals were also represented. Web of Science and ProQuest were included for completeness. SCImago Journal Rank[16] was searched to retrieve location information for journals where possible, and to retrieve country research output rankings for comparison with rankings in RTR output.

2.1 Search Strategy

The HeinOnline Law Journal Library was searched on 24 June 2024 for the term 'right to repair.' Results were filtered to include only articles or notes[17] and to exclude legislation, cases, hearings and other legal material. It was found that the phrase 'right to repair' appears frequently in unrelated fields of law such as tenancy, planning, and human rights law. Therefore, results were further filtered to exclude the terms 'reparation(s)', 'tenan(t/cy)' and 'humanitarian.' Scopus was searched on 24 June 2024 for 'right to repair' in the title, abstract and keywords fields.[18] Filters were then applied to reduce the results to only articles in scholarly journals published after 2012. ProQuest was searched on 24 June 2024 for 'right to repair' in all fields, then filtered to only peer-reviewed articles in scholarly journals published after 2012. Web of Science was searched for 'right to repair' in the title, abstract, keywords or 'keywords plus' fields. Results were then filtered to articles published after 2012. The Westlaw Australia Secondary Sources library was searched for 'right to repair,' filtered to journals and periodicals published after 2012. Common alternative formulations for the phrase 'right to repair' were investigated, including 'RTR,' 'R2R' and 'fair repair.' It was found that the two initialisms are used to refer to a great many concepts across different fields and returned an inordinate number of irrelevant results, so they were not used. In any case, the alternative phrases never appear in the RTR literature without 'right to repair' also appearing, making them redundant. Table 1 provides a summary of the sequence of queries used with each database and the progressive results for each query.

[14] Grant, "Typology of Reviews"; Sutton, "Meeting the Review Family."
[15] Pickering, "Systematic Quantitative Literature Reviews."
[16] SCImago. "SCImago Journal & Country Rank."
[17] In US legal journals, a 'note' is an article or analysis written by a student, rather than by a legal academic or practitioner. Notes are still subject to peer-review and to the editorial standards of the relevant journal.
[18] The 'title, abstract, keywords' search avoids the false positives that appear in full-text searches where right to repair is mentioned only in passing or in a footnote.

Table 1. Sequence of searches conducted on included databases

Query	Results
HeinOnline	
"Right to repair"	1,505
"right to repair" NOT reparation*	1,314
"right to repair" NOT reparation* NOT tenan*	634
"right to repair" NOT reparation* NOT tenan* NOT humanitarian	615
Date published: 2012-present	281
Publication type: Article or Note	233
Scopus	
"Right to repair" (all fields)	489
"Right to repair" (title, abstract, keywords)	108
Document type: articles	64
Source: journal	60
Date published: 2012-present	59
ProQuest	
"Right to repair" (all fields)	12,567
Source: Scholarly journals	275
Document type: article	213
Review: peer reviewed	190
Date published: 2012-present	183
Web of Science	
"Right to repair" (title, abstract, keywords, keywords plus)	79
Document type: article	58
Date published: 2012-present	57
Westlaw Australia	
"Right to repair"	50
Date published: 2012-present	35

2.2 Screening and Data Collection

A total of 563 records were retrieved from initial database searches. 105 records were duplicates and were excluded. The remainder were screened by a single reviewer (the author) for relevance. A further 328 were excluded on the basis that RTR was not the principal focus of the article. Of the remaining 130 records, 44 were excluded because they were either not written in English, not published as academic articles, or did not deal with legal barriers to repair, resulting in 85 documents being included in the final review (see Figure 2). The PRISMA flow diagram was generated using an online tool by Neal Haddaway et. al.[19] A database containing preliminary category headings was created in Excel. Included documents were then scanned and coded according to the category headings. During the process of scanning and coding, category headings were refined several

[19] Haddaway, "PRISMA2020."

times. Articles that had already been read and coded were reread and recoded where necessary. Articles dealing with medical RTR were then coded in more detail. Studies were not assessed for bias.

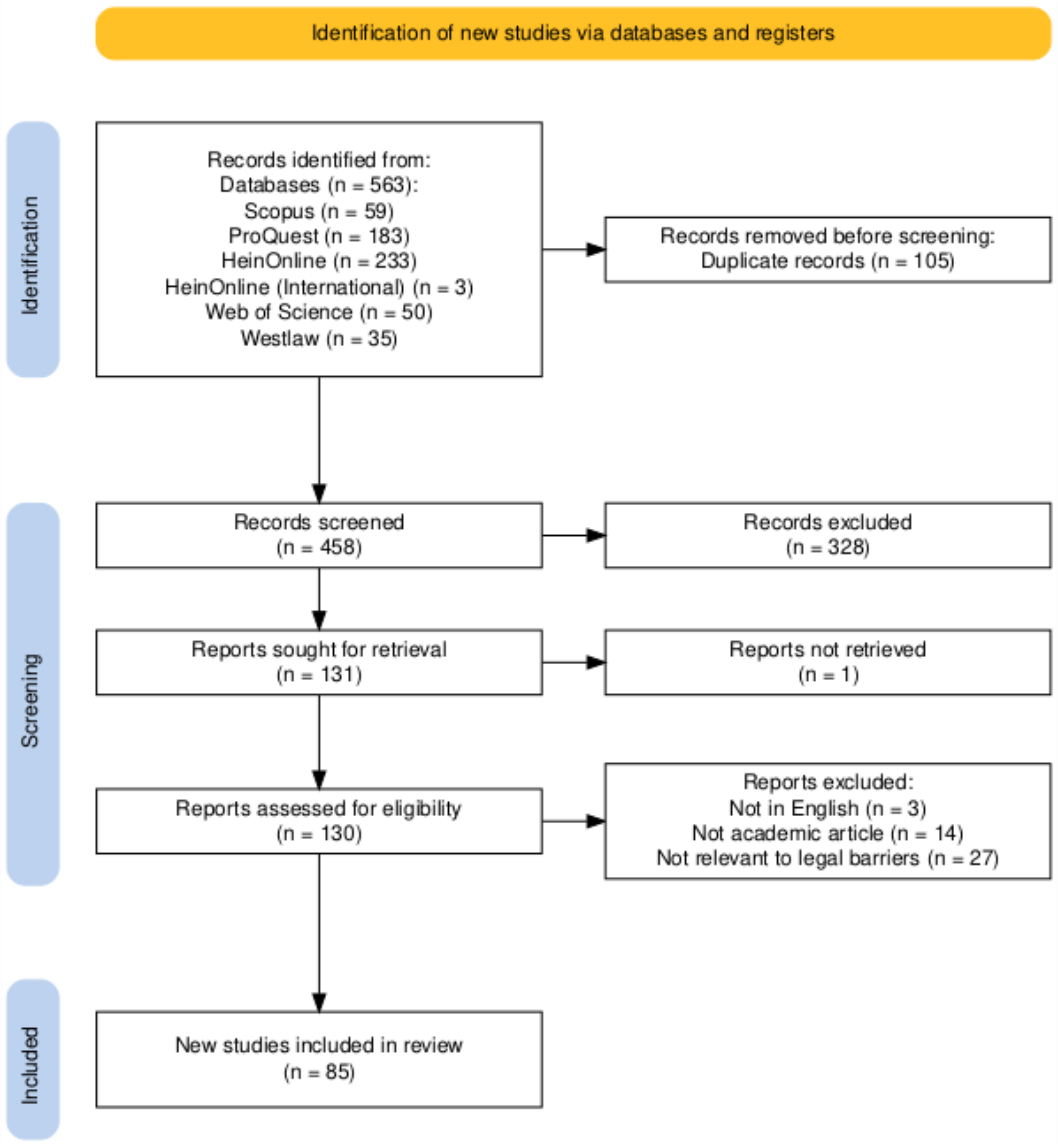

Figure 1. Screening diagram generated online using the PRISMA2020 app

3. Results

3.1 How is 'Right to Repair' Described?

As mentioned in the Introduction, barriers to the repair of goods have multiple causes and multiple consequences. Depending on the theoretical focus of the author, papers in the RTR field tend to emphasise certain causes or consequences over others and hence 'frame' RTR in accordance with those emphases (see Figure 3). Few documents adopted a single framing. Many, for example, associated consumer rights with anticompetitive behaviour and IP overreach. The most common framing of RTR was as an environmental issue related to the waste (particularly e-waste) arising from high rates of production and short device lifespans. This framing appeared in 56% (48 of 85) of documents. The coloured sections of the bars in Figure 3 show that environmental framing is appreciably more prominent in European literature than in that from the US: 37% of EU documents applied an 'overproduction or waste' framing, while only 16% of US documents did so. The next most common framing was of RTR as a consumer rights issue (48% of documents), followed by 'IP overreach' (37% of documents) and 'unfair competition

or monopoly.' These three framings frequently appeared together, with at least two of them appearing together in 70% (60 of 85) of documents. All other identified framings appeared far less frequently in the literature: technical innovation (20%), social cohesion and democracy (16%), public health (12%) or economic justice (9%). Public spending (3.5%) only appears as a framing issue alongside public health and not otherwise.

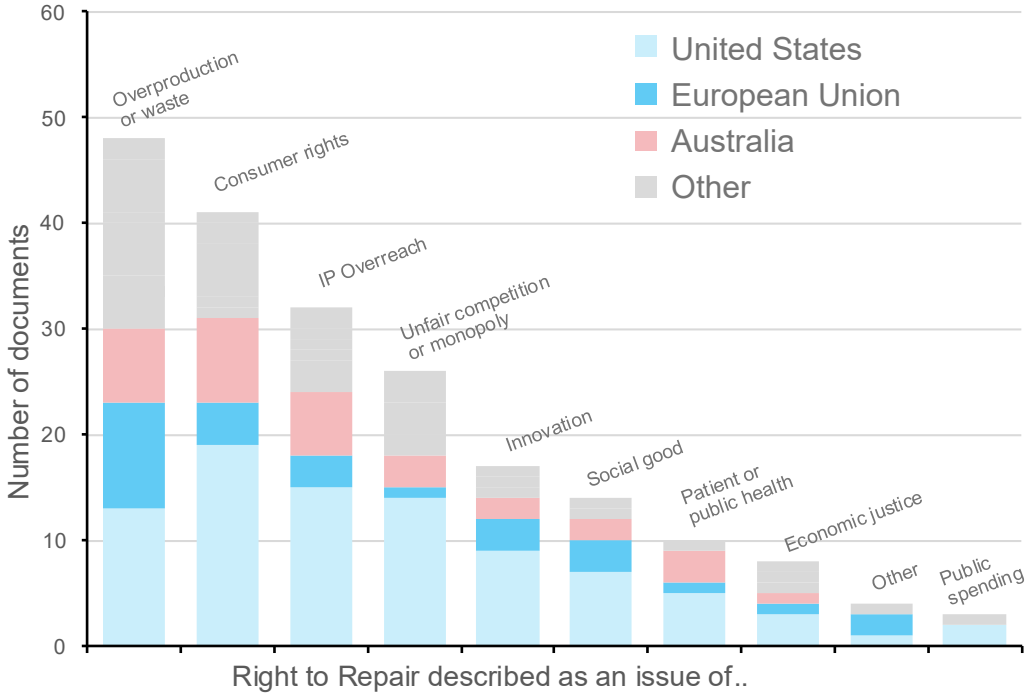

Figure 2. How documents describe the issue of Right to Repair, separated by region

3.2 Who published When, and From Where?

Academic articles addressing RTR accelerated throughout the selected period of this study (2012 to mid-2024), which corresponds with an increase in official attention at the same time (see Figure 1). Figure 4 shows a similar pattern with respect to academic publications. In 2012 there were no identified documents. 12% (10 of 85) of the identified documents were published in the seven years 2013-2019 inclusive, 81% of included documents (69 of 85) were published in the five years from 2019 to 2023, and 58% (50 of 85) were published in the three years 2021 to 2023.[20] Up to the time of the search in June 2024 the rate of publication was 1.7 documents/month for 2024, compared to 1.8 documents/month in 2023. The increase in publications after 2019 followed several high-profile, repair-related regulatory changes as can be seen in Figure 1.

[20] Documents were only collected up to 24 June 2024, so the rates of publication relate to periods of only 4.5 and 2.5 years respectively.

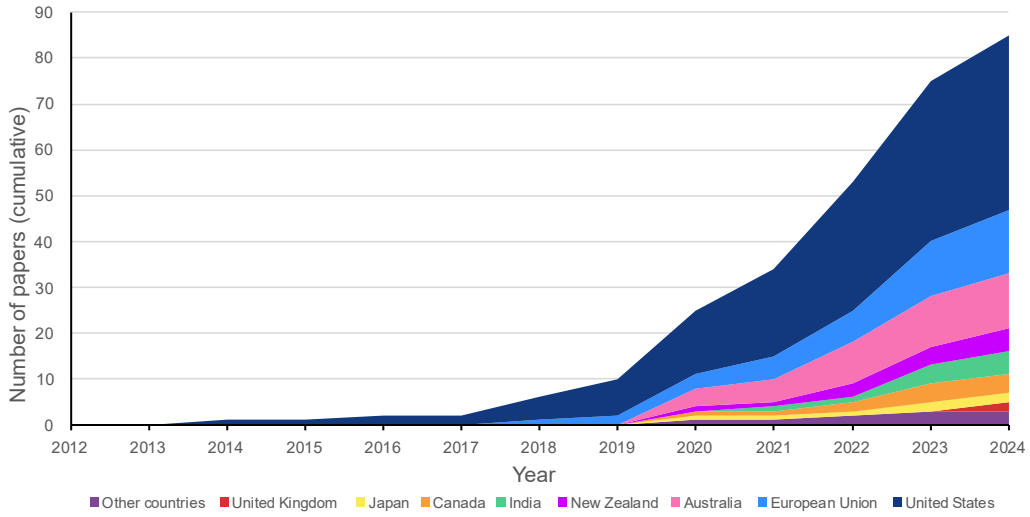

Figure 3. Documents published by year and country

The RTR literature remains somewhat limited in volume, geography, and jurisdictional scope. Table 2 shows that publications concentrate in US, UK, Australian or European sources. The *Australian Intellectual Property Journal* and *Berkeley Technology Law Journal* are preponderant, each having published a special issue on RTR.

Table 2. Most active journals

Publication title	Location	Records
Berkeley Technology Law Journal	US	10
Australian Intellectual Property Journal	Australia	6
Sustainability	Switzerland	4
Journal of Intellectual Property Law and Practice	US	2
Journal of Intellectual Property, Information Technology and E-Commerce Law	Germany	2
Journal of World Intellectual Property	United Kingdom	2
New Zealand Law Journal	New Zealand	2
Competition and Consumer Law Journal	Australia	2
Transactions: The Tennessee Journal of Business Law	US	2
International Journal on Consumer Law and Practice	India	2
Journal of Cleaner Production	United Kingdom	2

A relatively small group of authors are responsible for a significant portion of current RTR literature (Table 3). Authors with more than one article on RTR were Anthony Rosborough (4), Leah Chan Grinvald (4), Ofer Tur-Sinai (4), Leanne Wiseman (4), Kanchana Kariyawasam (3), Taina Pihlajarinne (3), Matthew Rimmer (3), Aaron Perzanowski (2), Michael Carrier (2), Kayleen Manwaring (2) and Thandar Zaw Win (2). The output of these eleven authors makes up 25% of the entire retrieved corpus. Even this figure understates their real contribution, since they have also produced book chapters,[21] conference papers, policy submissions[22] and monographs[23] not included in this study.

[21] Manwaring, "Repairing the Third Wave of Computing"; Grinvald, "Feminist Right to Repair."
[22] Rimmer, "Submission No 42 to Treasury"; Rimmer, "Submission No DR168 to Productivity Commission"; Wiseman, "Submission No 105 to Productivity Commission."
[23] Perzanowski, Right to Repair.

Table 3. Authors with more than one published article on right to repair

Author	Institution	Country	Articles
Rosborough, Anthony	Dalhousie University	Canada	4
Grinvald, Leah Chan	Suffolk University	US	4
Tur-Sinai, Ofer	Ono Academic College	Israel	4
Wiseman, Leanne	Griffith University	Australia	4
Kanchana Kariyawasam	Griffith University	Australia	3
Pihlajarinne, Taina	University of Helsinki	Finland	3
Rimmer, Matthew	Queensland University of Technology	Australia	3
Carrier, Michael A.	Rutgers University	US	2
Manwaring Kayleen	University of New South Wales	Australia	2
Perzanowski, Aaron	Case Western Reserve University	US	2
Zaw, Win Thandar	University of Waikato	New Zealand	2

RTR scholarship is centred in high-income countries (Table 2 and Table 3).[24] US institutions account for nearly half (38 of 85) of all documents. Figure 5 shows that by 2019, US articles still made up almost all the results (8 of 10), with the EU contributing two. By 2020, several other countries were represented. Smaller economies are not well represented in the literature, even though RTR is a live policy issue in some.[25] China and India, which occupy peculiar positions as both importers and major producers of e-waste, account for one and two articles respectively.[26]

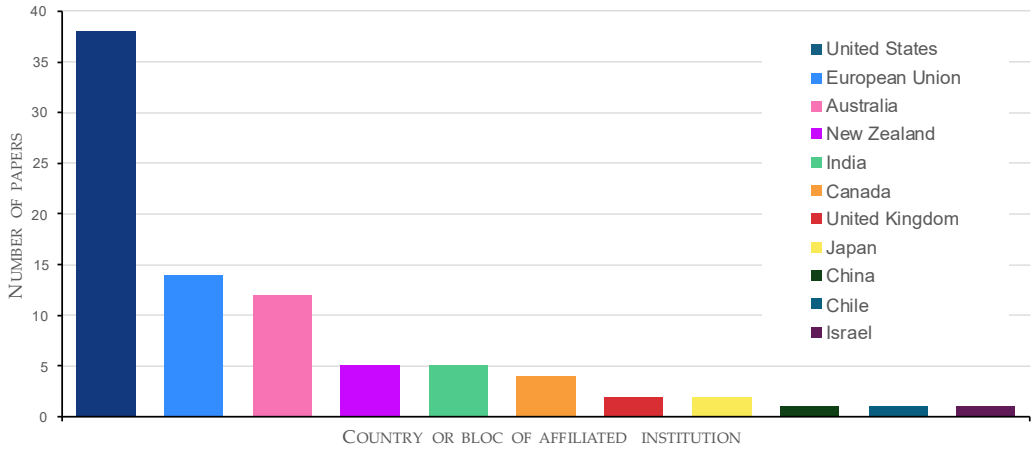

Figure 4. Country or bloc of author's primary affiliated institution

[24] Hamadeh, "Country Classifications."
[25] See for example "Policy Lab Africa"; TechCentral, "Pressure on South Africa."
[26] Subramanya, "Consumer Rights in India"; Quan, "Right to Repair in China's Copyright Law"; Nigama, "Right to Repair for E-Waste Reduction."

Figure 6 shows the correspondence between jurisdiction and the mention of different legal frameworks. IP, competition and consumer law are predominant. There is a greater emphasis on environmental law in the European jurisdictions.[27]

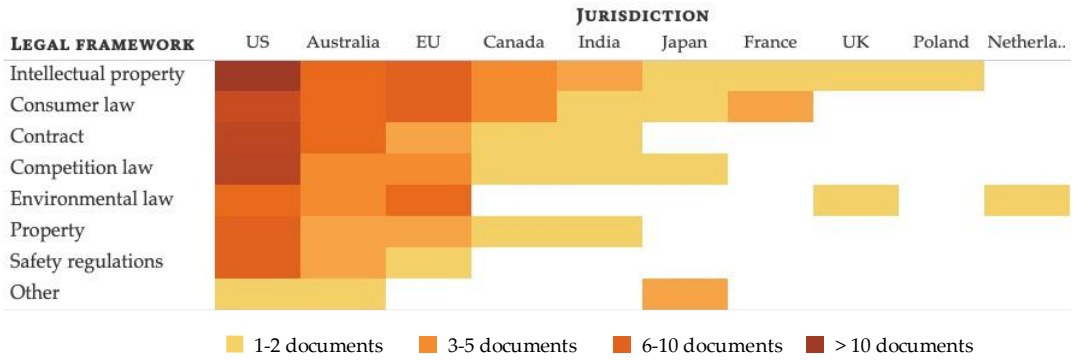

Figure 5. Relationship between jurisdictional focus and legal framework

3.3 Industries and Devices

Consumer electronics are the most discussed device type across all the literature by some margin (Figure 7).

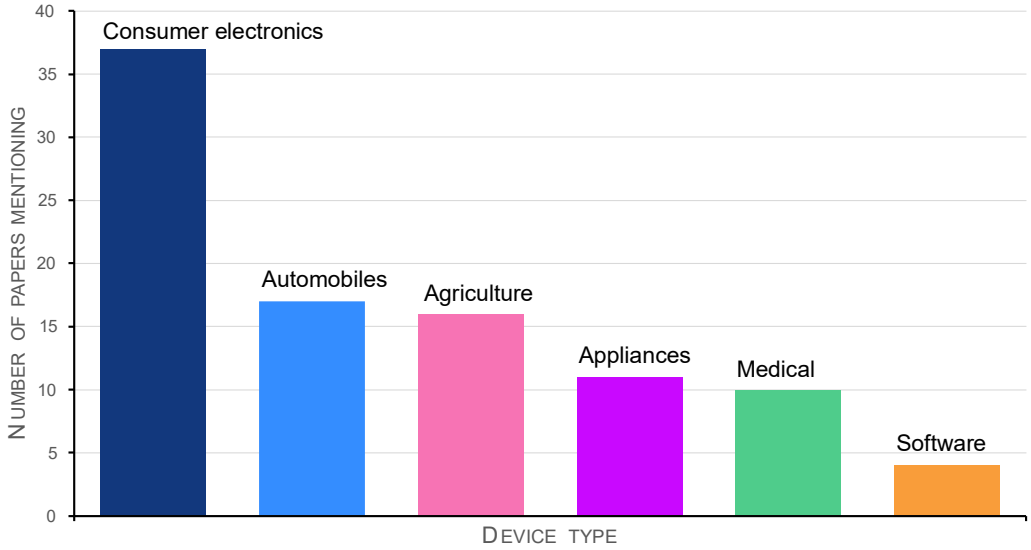

Figure 6. Frequency of device type mentioned in RTR literature

But when device types are compared with the jurisdictions in which they are discussed (Figure 8),[28] we see that industries producing high-value, long-lived products (automobiles, agricultural and medical equipment) are discussed at much greater frequency in higher-income countries. Figure 8 shows the frequency with which certain device types are mentioned in relation to the jurisdiction discussed in the article. A heavy emphasis on agricultural RTR in the US is evident, reflecting the dynamic between its large agricultural sector and dominant manufacturers such as John Deere. Medical devices are frequently mentioned in documents with a US, EU or Australian focus, but are absent elsewhere. This emphasis is attributable to post-COVID discussions of readiness and resilience in the medical industry (see Figure 9).

[27] Environmental law here meaning that focusing on waste disposal, product lifecycle or 'ecodesign' principles. See Hernandez, "Empowering Sustainable Consumption," 3.

[28] Figure 10 shows TF-IDF normalised frequency of articles mentioning device types versus the represented jurisdiction. TF-IDF (Term Frequency-Inverse Document Frequency) normalisation accounts for the high total number of articles focusing on the US and EU, which would otherwise skew the results toward devices mentioned in those jurisdictions. Normalised data was then weighted by article count to avoid the appearance of outliers in which a single jurisdiction and single device type appear unusually prominent.

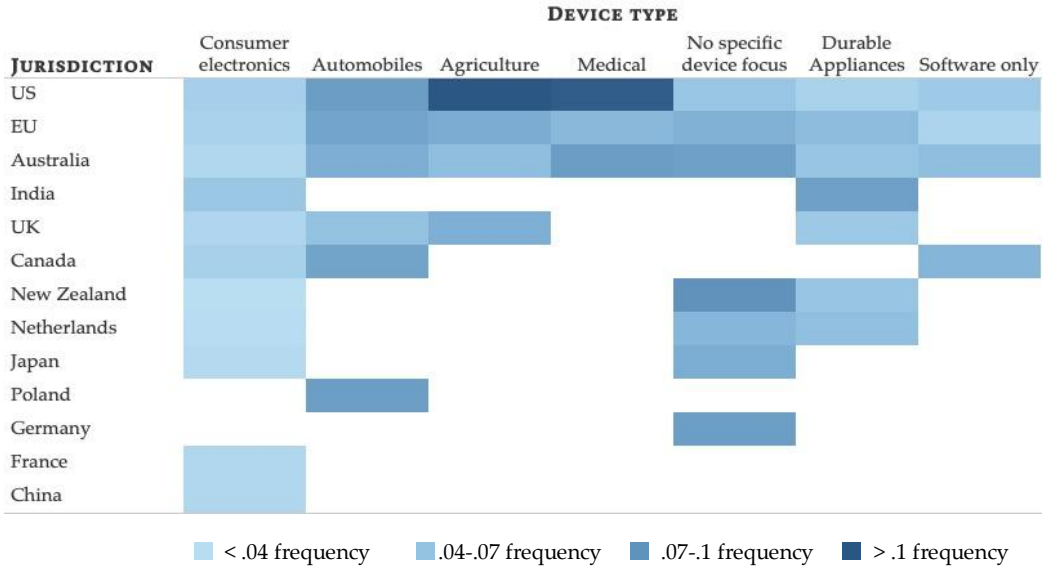

Figure 7. Frequency of mentioned device type in relation to article's jurisdictional focus

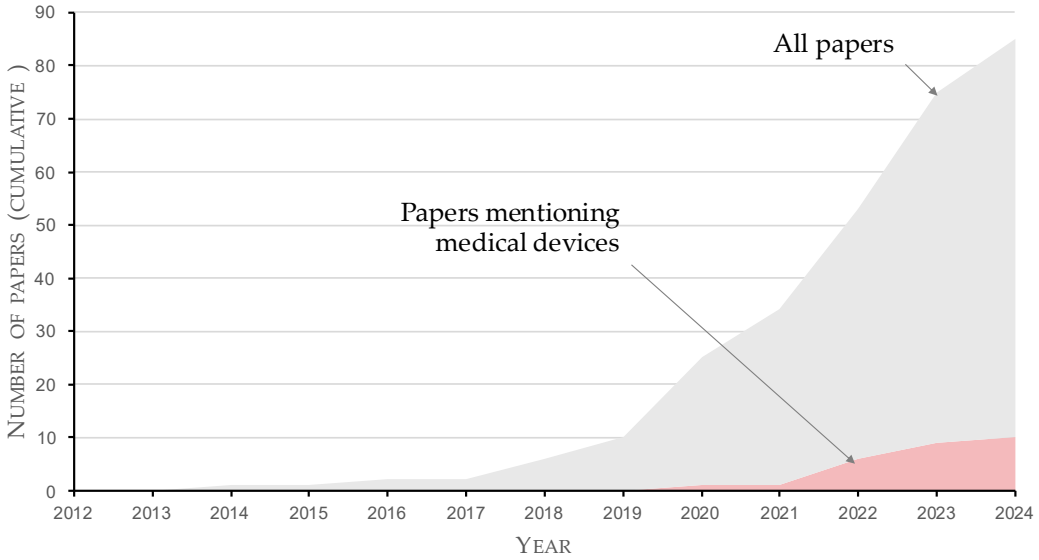

Figure 8. Documents with a medical device focus

Medical devices are a recent entry into the RTR literature. Figure 8 appears to show a strong emphasis on medical devices in the US, EU and Australia, but that belies the recency of the phenomenon. Figure 9 compares the rate of publication of all papers with those that discuss medical devices and demonstrates that documents discussing medical device RTR appear exclusively after 2019. At this time, the COVID-19 pandemic had drawn public attention to an urgent need for functioning ventilators.[29] In the US, the *Critical Medical Infrastructure Right-to-Repair Act*,[30] which sought to temporarily exempt medical device repair information from copyright protection, drew headlines and prompted academic notice.[31] In Australia, where hospitals experienced less overload as a result of COVID infections, authors placed more emphasis on the availability of personal protective equipment (PPE) than on the repair of hospital equipment.[32]

[29] Bliss, "Broken Ventilators."
[30] Critical Medical Infrastructure Right-to-Repair Act of 2020, HR 7956, 116th Cong (2020).
[31] He, "Right to Save Lives"; Tur-Sinai, "Repairing Medical Equipment."
[32] Abbas, "3D Printing in Response to COVID-19"; Rimmer, "Medical Right to Repair."

Aside from PPE, whose use is most often discussed in a hospital setting, the emphasis has been on larger, hospital-managed machines. Almost all (nine of 10) articles that discuss medical device RTR use ventilators as an example, for the reasons discussed above. Other large, complex machines such as imaging devices, anaesthesia machines and defibrillators were also commonly referred to. This reveals a twofold gap in the RTR literature: user-managed medical devices, whose owner or user is responsible for maintaining and repairing their device, and assistive technologies of almost every kind.

Progressive computerisation or 'digitalisation'[33] of everyday products impedes repair in two ways: first, repair of microcircuitry requires specialized skillsets and tools,[34] and second, software copyright and user licensing introduce legal restrictions that do not apply to purely mechanical goods. This study recorded the different levels of digitalisation of the devices that were the subject of RTR articles, where it was ascertainable.[35] Figure 10 is a heat map showing the relative frequency the different digitalisation levels across the relevant device types. Device types containing embedded software were the most discussed across all industries, even though all the reviewed industries have moved comprehensively beyond simple embedded software in the direction of network-enabled ('Internet of Things' or IoT) devices.[36] Fewer articles mention IoT as a specific issue affecting repair. Those that do note that reliance on server software introduces several complications, such as the effective impossibility of users accessing and patching server software, and the possibility that devices may stop working if the cloud service becomes unavailable.[37]

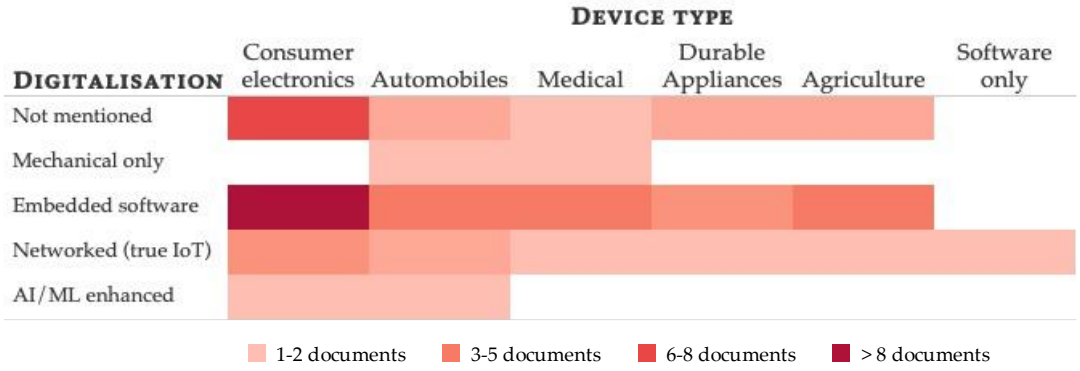

Figure 9. Relationship between device type and level of digitalisation

3.4 Barriers to Repair

Barriers to repair cited in the literature were categorised into legal, technical, and market barriers. The most cited legal barriers to repair were copyright law (67% of documents), including technological protection measures (TPMs) and anti-circumvention provisions, followed by patents (50% of documents) and restrictive software licenses (29% of documents). Technical barriers such as device activation and parts pairing are mentioned less often (19% and 7% of documents respectively). Market barriers—particularly unavailability of parts and repair information—were discussed most often (58% of documents), alongside the lack of repair outlets (14), technicians (12), consumer steering (9), switching costs (9), and the unavailability of training (8).

As mentioned, barriers to repair do not occur in isolation but act together to limit consumers' repair options. The RTR literature reflects a growing understanding of this fact. Figure 11 shows the average number of repair barriers mentioned in RTR articles each year, along with a logarithmic trend line showing the increase over time. The average number of barriers to repair mentioned in each document rose from 4 in 2014 to 9.8 in 2024. The recognition that multiple barriers to repair exist across several areas of law has implications for policymakers, which are explored in section 4.3.

[33] Rosborough, "Repair as Research."
[34] Manwaring, "Slowing down the Loop," 4.
[35] 'Digitalisation' here means the position or progress along a supposed scale of digital complexity, with purely mechanical devices at one end, through devices with embedded software, then those with network connectivity and cloud software components, to those operating with artificial intelligence (AI) software at the most complex end.
[36] Some authors are discussing this transition but attention has been industry specific. See Grinvald, "Smart Cars, Telematics and Repair."
[37] Gomulkiewicz, "Right to Repair Software."

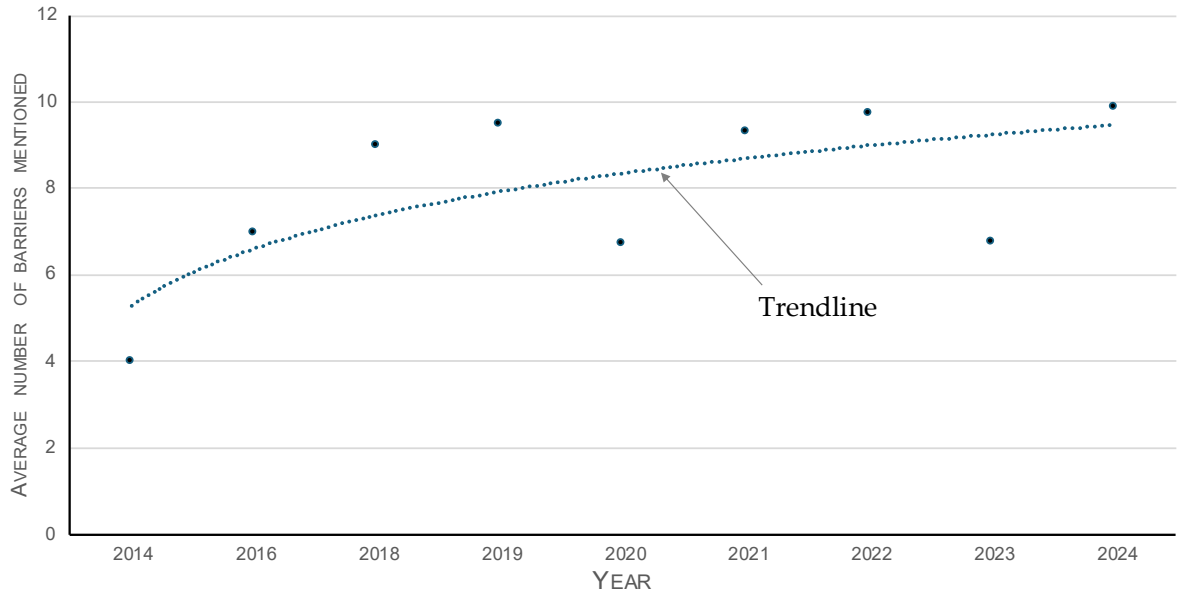

Figure 10. Average number of repair barriers mentioned by documents per year

3.5 Planned and Premature Obsolescence

Twenty six of 85 articles (30%) argued that a strategy of planned obsolescence—the deliberate shortening of product lifespans to encourage new sales—was a factor in manufacturers' efforts to restrict repair (Figure 12). A Phi coefficient correlation analysis was performed to assess the correlation between claims of planned obsolescence and various device types. Consumer electronics and durable appliances (such as fridges and washing machines) were found to be positively correlated with concerns about planned obsolescence. A small negative correlation existed between planned obsolescence and medical devices, suggesting that it was not a central issue for authors discussing repair in the medical field. These authors may be concerned with more pressing problems, such as gaining access to parts and diagnostic information, rather than with interrogating the commercial motivations of manufacturers.

	No specific device	Automobiles	Agriculture	Medical	Durable Appliances	Consumer electronics	Planned obsolescence
No specific device	1	-0.25	-0.26	-0.17	-0.21	-0.45	0.16
Automobiles	-0.25	1	0.32	0.06	0	0.18	-0.04
Agriculture	-0.26	0.32	1	-0.06	-0.1	0.21	0.01
Medical	-0.17	0.06	-0.06	1	0.11	-0.19	-0.04
Durable Appliances	-0.21	0	-0.1	0.11	1	0.4	0.28
Consumer electronics	-0.45	0.18	0.21	-0.19	0.4	1	0.2
Planned obsolescence	0.16	-0.04	0.01	-0.04	0.28	0.2	1

Figure 11. Correlation chart of device type and claims of planned obsolescence. Red=positive correlation; blue=negative correlation. A value of 1 indicates 100% correlation.

4. Discussion

The results of this study show that the RTR movement is closely linked with the historical process of product digitalisation, and that manufacturers have taken advantage of this complexity, along with favourable IP policies and restrictive licensing, to limit consumers' post-sale autonomy over their purchases, including by deterring product repair. All the industries reviewed in this study now obtain value from producing complex, expensive software-enabled devices, meaning that software-related barriers to repair are common across industries. Any effort to restore the balance of power between manufacturers and consumers with respect to repair must therefore address the way that IP and restrictive licensing is used to prevent consumers from legally repairing their devices. Some progress has been made in certain jurisdictions through clarification of patent exhaustion and the introduction of repair exemptions to copyright law, but the results are piecemeal and inconsistent. Moreover, the literature has trailed behind the pace of technological development. Further inquiry should therefore be undertaken into

appropriate regulatory responses to the (likely) further erosion of consumer autonomy resulting from a move to cloud computing and artificial intelligence/machine learning (AI/ML).

The study has also found an overlap between practical and legal restrictions on repair, and perceptions of premature obsolescence. In one sense, any manufacturer restriction on repair can be argued to fall within a broad definition of premature obsolescence, since the result is to maximise profit for the manufacturer through early replacement or capture of the repair market. Premature obsolescence, and repair barriers more generally, may be seen as a competition and consumer problem, an environmental problem, or both. This crossing into different legal categories may make it difficult to settle on an appropriate regulatory response. Although it has been elsewhere argued that a 'comprehensive' response is necessary,[38] it may prove to be more pragmatic and achievable to focus on narrower, specific outcomes (such as repair supply obligations for certain products or industries), that would in the aggregate amount to a substantive 'right to repair.'

4.1 The RTR Movement is a Consumer Society Phenomenon

Manufacturers' use of intellectual property rights to control and avert competition in the repair aftermarket is the main target of opposition by the RTR campaign. There is a close connection between digitalisation of devices, the value of the intangible property in those devices and the increasing use of technical and legal barriers to repair. As the ongoing digitalisation of our devices proceeds, their utility and economic value resides increasingly in the software that drives them. Although patents on parts remain a major source of manufacturer power over the repair aftermarket, modern devices' reliance on software has made copyright the more prominent tool in limiting repair. Copyright in software is long-lived and benefits from anti-circumvention provisions that criminalise efforts to bypass TPMs, even without infringing use. This model of software protection is widely distributed thanks to various international agreements[39] and has allowed device manufacturers to strictly control how users interact with their products long after the point of sale.[40]

Given the close connection between intellectual property and repair barriers, it is no surprise that the RTR literature reviewed in this study is heavily weighted toward high-income countries, for which IP is a considerable source of economic wealth and in which consumer behaviour is shaped by the consumption of IP-heavy goods (see Figure 5 and Table 3). For this reason, recent emphases on repair in these countries has been described as a 'lifestyle movement'[41] of the affluent, in contrast to the types of survival-oriented and 'make-do' repair practices that characterise less affluent and indigenous societies.[42] Repair-oriented community efforts such as repair cafés have become increasingly visible aspect of the repair movement but the overwhelming majority remain in wealthy, consumer societies.[43]

This is not to devalue the utility of repair or of the RTR movement, but to locate it within a particular economic and cultural sphere. The global production and distribution of digitally enabled cars, tractors, toys and pacemakers is introducing the same types of repair barriers to consumers worldwide. Although RTR literature and campaigning is centred within wealthy countries, the issues will eventually impact upon consumers in most countries. Whereas highly industrialised consumer economies often also enjoy relatively strong consumer protection and competition laws, it may not be the case that smaller, less wealthy countries can put up the same types of resistance to manufacturers' monopolistic tendencies. The so-called Brussels Effect or California Effect[44] may partly address this gap. Where manufacturers must comply with RTR provisions in major economies like the EU and US, they may elect to do the same in other countries 'for free', without the need for local intervention. The Brussels Effect is not a panacea, however. It can operate to improve product longevity or design where it is uneconomical to maintain separate product lines in different jurisdictions,[45] or it may mean that parts can be ordered globally where they once could not, but it may not translate into other aspects of repair such as information sharing or the ability to bypass digital locks.

[38] Fillman, "Comprehensive Right to Repair."
[39] See for example *Agreement on Trade Related Aspects of Intellectual Property Rights*, signed 15 April 1994, entered into force 1 January 1995. Some bilateral agreements impose further obligations.
[40] Perzanowski, "The Tethered Economy."
[41] Graziano, "Politics of Collective Repair."
[42] Badami, "Informality as Fix."
[43] Nearly 70% of the locations at listed repaircafe.org are in France, Germany or the Netherlands. Repair Café, "About."
[44] The Brussels Effect refers to the outsized influence EU regulations have on international commercial practice. Bradford, Brussels Effect; The California Effect is a similar concept, positing that California's size and wealth has tended to drive environmental regulations upward in other jurisdictions. Vogel, "Trading Up," 6.
[45] Bradford, Brussels Effect, 60.

4.2 Premature Obsolescence is Discussed Mainly in the Context of Consumer Electronics

That fact that RTR appears to be a consumer society phenomenon may also help to explain why articles mentioning premature obsolescence[46] do so more often in the context of consumer electronics and durable appliances (see Figure 12). Overconsumption and waste have become topics of general concern in consumer societies (note in this respect the predominance of that theme in RTR framings—see Figure 3).[47] Durable appliances and consumer electronics tend to have comparatively short lifespans in comparison with (say) automobiles or agricultural equipment, making their premature disposal a more visible problem. While only 30% of retrieved articles explicitly discussed premature obsolescence it is considered by some to be central to understanding RTR.[48] Practices such as limiting access to repair supplies, limiting product interoperability, designing products to deter repair, and restrictions on 'unauthorised' repair, refurbishment or resale all contribute to premature product disposal.[49] It is however difficult to find direct evidence of an intention to shorten product lifespans[50] and manufacturers can point to other plausible motivations for an anti-repair stance.[51] These facts might help to explain why premature obsolescence is not addressed directly in more of the RTR literature, which focuses on established frameworks such as competition and intellectual property.[52] As the literature matures, however, a wider array of perspectives is being brought to bear.

4.3 A Broadening Definition of RTR Has Led to Indistinct Legal Priorities

The perception of RTR has broadened from a competition and consumer law issue to one encompassing digital property rights,[53] environmental harms,[54] even social cohesion[55] and democracy itself.[56] Consequently, the range of suggested regulatory and policy responses has also widened. Naturally, the interventions that are proposed reflect the way the problem is posed. Where RTR is characterised as a response to the problem of anticompetitive conduct[57] or over-broad IP rights, proposed solutions involve regulatory action against purported monopolists (including spare parts guarantees),[58] limiting the scope of IP grants,[59] or repair-related exemptions to IP laws.[60] Where RTR is characterised as a problem of overproduction and poor-quality or repair-hostile design, suggestions may also involve spare parts guarantees, or mandating repairable design (including the use of standard parts and tools). As RTR becomes increasingly recognised as a multi-factored problem (Figure 11), it becomes increasingly hard to present pragmatic and workable policy solutions. Arguments for 'comprehensive' reform[61] or 'multisolving'[62] repair barriers may face difficulties gaining policy adoption. RTR scholarship that deals with specific legal barriers that cause specific problems in specific industries may be more successful in advancing the cause of repair overall. Proposing sound policy is of course made more difficult by ongoing rapid advances in technology.

4.4 There is Limited Engagement with the Novel Challenges of AI and IoT

The literature has not yet grappled extensively with the repair implications of networked (IoT) devices and AI/ML. It is well recognised that embedded software has become ubiquitous[63] and microcircuitry makes devices more complex and harder to diagnose.[64] The fact that embedded software can make repair difficult and legally fraught is also well canvassed.[65] But nearly

[46] Premature obsolescence includes but is broader than 'planned' obsolescence. Several taxonomies of premature obsolescence have been proposed. A useful recent assay can be found in Becher, "Confronting Product Obsolescence."
[47] The French government has made planned obsolescence a criminal offence, suggesting that a sense of urgency is felt in some quarters. Bisschop, "Designed to Break".
[48] DuBeau calls premature obsolescence the "conceptual opposite" of right to repair. See DuBeau, "Antitrust & the Right to Repair."
[49] Australian Productivity Commission, Right to Repair, 201.
[50] Australian Productivity Commission, Right to Repair, 214.
[51] Maitre-Ekern, "Regulating Planned Obsolescence," 316.
[52] The EU Ecodesign regulations do explicitly seek to address premature obsolescence. European Parliament, "Ecodesign."
[53] Kreiczer-Levy, "Consumer Bundle."
[54] Turiel, "Consumer Electronic Right to Repair Laws"; Sparrow, "Ending over Mending."
[55] van der Velden, "Fixing the World One Thing at a Time."
[56] Lloveras, "Radical Democracy and the Right to Repair."
[57] Beal, "Reigning in John Deere:"; DuBeau, "Antitrust Law & the Right to Repair."
[58] Cadia, "Fix Me."
[59] A current issue in this domain is the potential of 3D printing to create patented spare parts. See Abbas, "3D Printing in Response to COVID-19"; Burns, "Intellectual Property and Additive Manufacture"; Rimmer, "Patent Law and 3D Printing."
[60] Chipman, "More Breaking, Less Rulemaking."
[61] Fillman, "Comprehensive Right to Repair."
[62] Gonzales, "Multisolving Innovations."
[63] "Practically every device is a purpose-built computer." Rosborough, "Repair as Research," 19.
[64] Manwaring, "Slowing down the Loop," 5.
[65] Austin, "Anti-Circumvention and the Function of the Work."

every industry has now moved comprehensively to producing IoT devices,[66] or is looking ahead to the AI/ML horizon.[67] Some authors have discussed how this transition introduces new challenges to independent repair. For example, Robert Gomulkiewicz and Ido Kilovaty have both noted that IoT devices rely on server software that is generally inaccessible for debugging or security review.[68] Leah Chan Grinvald and Ofer Tur-Sinai discuss how carmakers' adoption of wireless telemetry allowed them to circumvent existing right to repair laws which referred only to a physical data port.[69] A similar issue can be seen developing with some medical devices, which may communicate exclusively with a smartphone app[70] or a remote server.[71] Other than these examples, few authors looking at the repair of digital medical devices have yet treated the IoT issue in great depth.[72] There is ample scope to investigate the legal and practical implications of the move to server or app-based control of physical devices.[73] The effect of the upcoming wave of AI-supported decision making on repair is even less well understood.[74] This is of particular importance as software-assisted medical diagnosis and treatment becomes more common.

4.5 The Medical Device and Assistive Technology Industries are Understudied

The medical device industry is complex and not suited to one-size-fits-all approaches. The definition of 'medical device' under the Australian *Therapeutic Goods Act* (TGA) is broad and includes practically any instrument or device (including software) intended for human therapeutic use,[75] ranging from simple user-managed devices to complex hospital-based equipment. Further, the market for the supply and repair of medical devices is heavily regulated and incorporates both public and private funding models.[76] It is therefore difficult to propose rules appropriate to the entire industry. The PC thought that because of this complexity it lacked 'sufficient evidence to justify specific policy changes.'[77] Despite this, the PC found that the market for some specialised medical devices was highly concentrated and that buyer 'lock-in' and high switching costs might result in limited and expensive repair options.[78] Further, manufacturers' responsibility for the ongoing safety and efficacy of their devices under the TGA could lead them to 'limit, restrict or prohibit [their] repair.'[79] It therefore found 'sufficient valid concerns to warrant an independent public review' of the medical device market and regulations.[80] Such as review, it said, should be conducted on a 'device-by-device basis, where possible.'[81]

The medical device industry has consistently opposed RTR regulation, arguing that independent repair compromises patient safety and introduces cybersecurity risks.[82] There is little evidence to support these claims[83] but it has been an effective strategy: other than wheelchairs,[84] RTR legislation in the US, EU and Canada has uniformly excluded medical devices. The one exception to this is the US Library of Congress' decision in 2021 to allow the bypassing of digital locks on medical devices for the purpose of repair.[85] In any event, as the PC noted, not all repairs and not all devices carry the same degree of risk. Many medical devices pose little risk of injury, and repairs of high-risk devices are likely to be conducted by highly qualified, professional technicians.[86] Proposed policy recommendations can be cognisant of this fact and provide for improvements in access to repair where risk to patients is demonstrably lowest. For example, many complex, hospital-based devices require regular preventative maintenance (PM) routines. These routines carry little risk and are important for device longevity, but

[66] Determann, "Open Cars."
[67] Popov, "Digitalisation in Healthcare."
[68] Gomulkiewicz, "Right to Repair Software"; Samuelson, "Freedom to Tinker"; Kilovaty, "Freedom to Hack."
[69] Grinvald, "Smart Cars, Telematics and Repair"; Massachusetts has since updated that law to require that diagnostic telemetry data be provided to independent repairers. See Hagerty Media, "You Can Fix Your Cars Now."
[70] Medtronic, "MyCareLink Heart App"; Ottobock, "Cockpit App," 2.9.0.
[71] Stanley, "Secrets of the Medtronic MyCareLink Patient Monitor."
[72] See however Manwaring, "Slowing down the Loop"; Boniface, "Internet of Things."
[73] Urquhart, "Sustainable Internet of Things Futures."
[74] *Wired*, "Right to Repair for Artificial Intelligence."
[75] *Therapeutic Goods Act 1989* (Cth) s 41BD.
[76] Australian Productivity Commission, Right to Repair, 144.
[77] Australian Productivity Commission, Right to Repair, 145.
[78] Australian Productivity Commission, Right to Repair, 144.
[79] Australian Productivity Commission, Right to Repair, 145.
[80] Australian Productivity Commission, Right to Repair, 145.
[81] Australian Productivity Commission, Right to Repair, 145.
[82] Medtronic Australasia, "Submission No DR186 to Productivity Commission"; Stryker South Pacific, "Submission No 87 to Productivity Commission"; *Consumer Wheelchair Repair Bill of Rights Act: Hearing on HB22-1031 Before the H. Comm. on Public and Behavioral Health and Human Services,* 2022 Sess. 73rd Col. Gen. Ass. (Statement of Colorado Bioscience Association).
[83] US Food and Drug Administration, Servicing of Medical Devices.
[84] *Cal Bus & Prof Code* § 21300 (2024)*; Colo Rev Stat* § 6-1-105(1)(qqq) (2022).
[85] *Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies*, 86 Fed Reg 59627 (2021)*; Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies*, 86 Fed Reg 84537 (2024).
[86] US Food and Drug Administration, Servicing of Medical Devices, 2; Australian Productivity Commission, Right to Repair, 145.

biomedical engineers have reported being technically and contractually prevented from conducting them.[87] Others have reported that standard consumables such as batteries and memory storage can be serialised to prevent the use of third-party suppliers.[88] These examples may represent opportunities for improving access to repairs without unduly jeopardising patient safety. Hospitals and medical facilities represent a definite opportunity for further investigation. Hospital administration and in-house biomedical staff are well placed to provide a view on the types of devices that can be safely repaired but which are burdened by unnecessary impediments to repair.

Assistive technology (AT) has rarely appeared in the RTR literature as a category separate to medical devices. Part of the reason for this apparent oversight may be that RTR today is strongly associated with digitally enabled devices, and much AT is (or is seen as) simple, cheap and mechanical.[89] Some types of AT however, such as digital hearing aids, bionic prosthetics and electronic wheelchairs, are much more complex and expensive. These types of AT are vulnerable to the same legal repair barriers as affect other industries. They may have complex, patented parts, may require software (including smartphone apps and cloud services) to run[90] and may be serviceable only by manufacturer-authorised repairers.[91] Thus, they have begun to attract the attention of RTR campaigners[92] and regulators.[93] Given the extraordinary range of technology which falls under the banner of 'AT' (as with medical devices in general), any regulation might be best directed to these specific types of technology, where the combination of device cost, complexity, and consumer disadvantage[94] makes repair barriers most harmful. Recent US state wheelchair RTR statutes[95] provide good examples of device-specific legislation that can be drawn upon as examples for future reform. The author has undertaken more extensive analysis of these laws elsewhere.[96]

4.6 Study Limitations

The review was conducted by a single investigator; therefore, inclusion and exclusion decisions were not subject to reliability testing. This methodological limitation was an unavoidable incident of the limited budget and resources available but may affect the reliability and reproducibility of its findings. These resource constraints also made it impractical to complete certain elements of the PRISMA 2020 checklist—for example, a statistical investigation into data quality.[97] To address this limitation, the raw dataset is made available at the end of this article.

The review's search strategy was also relatively simplistic. Only the phrase 'right to repair' was used to search relevant databases. Such a simple search strategy may mean that articles that deal with legal barriers to repair but which do not use the term 'right to repair' were missed. In defence of the strategy, the search phrase has very few cognates that appear where the phrase 'right to repair' is not also used. It can also be noted that the term 'right to repair' is of US English origin and so carries its own historio-legal connotations. Other conceptions of the tension between end-user and third-party rights and those of manufacturers may not be captured by that term.

Some databases were selected to emphasise legal commentary, which in turn means that legal issues were given priority over other relevant issues, such as the environmental impact of repair barriers. Using the US-centric HeinOnline and Westlaw Australia databases would have overemphasised contributions from those countries. Only studies published in English were included, which may limit available perspectives or exclude some issues that are of interest in non-English speaking countries. Relying on Western law-oriented databases may also privilege certain notions of society and the place of law within it at the expense of more critical, radical, or non-Western viewpoints. Finally, by focusing on peer-reviewed articles the study excluded some important RTR literature[98] as well as a large body of grey literature in which much of the RTR discourse is carried on.

---

[87] BME05, interview by Yuri Banens, August 7, 2025; BME06, interview by Yuri Banens, August 7, 2025.
[88] BME06; BME11, interview by Yuri Banens, September 2, 2025.
[89] 'Some assistive products are relatively unaffected by technological progress (e.g. walking sticks, handpropelled wheelchairs and spectacles).' World Health Organisation, Assistive Technology, 6.
[90] Permobil, "MyPermobil App," 1.74.
[91] See for example the user manuals for any Permobil powered wheelchair. "Permobil Service Manuals."
[92] U.S. PIRG Education Fund, Stranded; Wiseman, "Restoring Human Dignity."
[93] *Colo Rev Stat* § 6-1-105(1)(qqq) (2022)*; Cal Bus & Prof Code* § 21300 (2024).
[94] Consumers are disadvantaged through, inter alia, information asymmetry and one-sided contracts of adhesion that limit what they can do with their digital devices. Becher, "Confronting Product Obsolescence"; Kreiczer-Levy, "The Consumer Bundle"; Perzanowski, End of Ownership.
[95] *Colo Rev Stat* § 6-1-105(1)(qqq) (2022); *Cal Bus & Prof Code* § 21300 (2024); *Nevada Wheelchair Repair Act*, AB 407, 83rd Leg, 2025 Reg Sess (Nev 2025).
[96] Banens, "Right to Repair and Powered Wheelchairs."
[97] PRISMA Statement, "PRISMA 2020 Checklist" items 13-15.
[98] One example is the influential Perzanowski, Right to Repair.

5. Conclusion

The study has identified research priorities and gaps in the RTR field through systematic review, with additional attention paid to the medical device and AT sectors. Although RTR scholarship remains concentrated in high-income consumer societies, and is still dependent on a relatively few authors, it has expanded its scope over time to encompass new industries and new jurisdictions. Scholarship has followed regulatory and advocacy attention, leaving gaps in some sectors where complex regulatory environments make solutions difficult. Medical devices and AT demonstrate this phenomenon, remaining understudied despite their critical importance. In keeping with the view that a 'step-by-step' regulatory approach may be most pragmatic, further study on RTR in the medical device and AT industries should focus next on the experience of specific industry subsectors such as in-house hospital biomedical engineers and on common digitalised AT such as powered wheelchairs and digitally enabled prosthetics. This will support the development of specific and appropriate policy responses, which can work in tandem with broader initiatives such as copyright reform to support safe and accessible medical device and AT repair.

Data

The raw data derived from the searches conducted in this study are available at https://research-repository.griffith.edu.au/items/bd0484f9-5b3a-4f55-9787-2030468c530f

Acknowledgements

The author thanks Professor Leanne Wiseman, Professor Charles Lawson and Dr Nicholas Charlton for their valuable feedback on earlier drafts of this article. The author is also grateful to Michelle DuBroy at Griffith University Library for her assistance designing the systematic database searches for this review.

Bibliography

Abbas, Muhammad Z. "Patent Law and 3D Printing Applications in Response to COVID-19: Exceptions to Inventor Rights." *Journal of World Intellectual Property* 25, no 2 (2022): 317–34. https://doi.org/10.1111/jwip.12224.

Austin, Graeme. "Anti-Circumvention Prohibitions and the Function of the Work." *Australian Intellectual Property Journal* 31, no 2 (2020): 120–32.

Australian Competition and Consumer Commission. "Designated Complaints." Web page. Australian Competition and Consumer Commission, July 24, 2025. Australia. https://www.accc.gov.au/about-us/designated-complaints.

Australian Productivity Commission. *Right to Repair*. Final Report. Productivity Commission, 2021.

Badami, Nandita. "Informality as Fix: Repurposing Jugaad in the Post-Crisis Economy." *Third Text* 32, no 1 (2018): 46–54. https://doi.org/10.1080/09528822.2018.1442190.

Banens, Yuri. "The Right to Repair and Powered Wheelchairs: Some Lessons for Australia?" *Journal of Law and Medicine* 32, no 4 (2026).

Beal, Max R. "Reigning in John Deere: Time for the Nebraska Unicameral to Enact Agricultural Right to Repair Legislation." *Nebraska Law Review* 102, no 1 (2023): 245-278.

Becher, Samuel and Anne-Lise Sibony. "Confronting Product Obsolescence." *Columbia Journal of European Law* 27, no 2 (2021): 97-150. https://doi.org/10.2139/ssrn.3756452.

Bisschop, Lieselot, Yogi Hendlin and Jelle Jaspers. "Designed to Break: Planned Obsolescence as Corporate Environmental Crime." *Crime, Law and Social Change* 78, no 3 (2022): 271–93. https://doi.org/10.1007/s10611-022-10023-4.

Bliss, Laura. "Broken Ventilators Add Momentum to 'Right to Repair' Movement." *Businessweek*, May 6, 2021. https://www.bloomberg.com/news/articles/2021-05-06/right-to-repair-movement-gains-momentum-as-states-consider-bills.

Boniface, Christopher, Lachlan Urquhart and Melissa Terras. "Towards a Right to Repair for the Internet of Things: A Review of Legal and Policy Aspects." *Computer Law and Security Review* 52 (2024). https://doi.org/10.1016/j.clsr.2024.105934.

Bradford, Anu. *The Brussels Effect: How the European Union Rules the World*. 1st ed. Oxford University Press, 2020. https://doi.org/10.1093/oso/9780190088583.001.0001.

Burns, Natasha. "Right to Repair: Intellectual Property and Additive Manufacture of Spare Parts." *Australian Intellectual Property Law Bulletin* 33, no 9 (2021): 150–53.

Cadia, Daniel. "Fix Me: Copyright, Antitrust, and the Restriction on Independent Repairs." *U.C. Davis Law Review* 52, no 3 (2019): 1701–46.

Chipman, Derek Russell. "More Breaking, Less Rulemaking: Why Congress Should Go beyond the Copyright Office's 1201 Report and Amend the DMCA to Require a Nexus to Infringement." *Berkeley Technology Law Journal* 33 (2018): 1067–90.

Determann, Lothar and Bruce Perens. "Open Cars." *Berkeley Technology Law Journal* 32, no 2 (2018): 915-988.

Digital Right to Repair Coalition (Repair.org). "Our Mission and History." Web page. Accessed July 3, 2025. https://www.repair.org/history.

DuBeau, Henry A. "Antitrust Law & the Right to Repair Movement: Why *Kodak* May Not Be Such a Bad Apple." *Syracuse Law Review* 74, no 1 (2024): 275-296.

European Commission. *A New Circular Economy Action Plan For a Cleaner and More Competitive Europe*. European Commission, 2020.

European Parliament. "Ecodesign: New EU Rules to Make Sustainable Products the Norm." Press Release. June 15, 2023. https://www.europarl.europa.eu/news/en/press-room/20230612IPR97206/ecodesign-new-eu-rules-to-make-sustainable-products-the-norm.

Fillman, Emma. "Comprehensive Right to Repair: The Fight Against Planned Obsolescence in Canada." *Dalhousie Journal of Legal Studies* 32 (2023): 123-156.

Gomulkiewicz, Robert W. "Considering a Right to Repair Software." *Berkeley Technology Law Journal* 37, no 3 (2023): 943-988. https://doi.org/10.15779/Z385M6277Z.

Gonzales, Amy L., Yeweon Kim and Laurent H. Wang. "Multisolving Innovations: How Digital Equity, e-Waste, and Right-to-Repair Policies Can Increase the Supply of Affordable Computers." *Policy and Internet* 15, no 2 (2023): 162–77. https://doi.org/10.1002/poi3.331.

GPC Asia Pacific. "*Supplementary Submission ('The History of Right to Repair in the United States') to Australian Competition and Consumer Commission,* New Car Retailing Industry Market Study 2016-17." March 30, 2017. https://www.accc.gov.au/system/files/GPC%2520-%2520The%2520History%2520of%2520Right%2520to%2520Repair.pdf.

Grant, Maria J. and Andrew Booth. "A Typology of Reviews: An Analysis of 14 Review Types and Associated Methodologies." *Health Information & Libraries Journal* 26, no 2 (2009): 91–108. https://doi.org/10.1111/j.1471-1842.2009.00848.x.

Graziano, Valeria and Kim Trogal. “The Politics of Collective Repair: Examining Object-Relations in a Postwork Society.” *Cultural Studies* 31, no 5 (2017): 634–58. https://doi.org/10.1080/09502386.2017.1298638.
Grinvald, Leah Chan and Ofer Tur-Sinai. “A Feminist Right to Repair.” In *Feminist Cyberlaw*, edited by Meg Leta Jones and Amanda Levendowski. University of California Press, 2023.
Grinvald, Leah Chan and Ofer Tur-Sinai. “Smart Cars, Telematics and Repair.” *University of Michigan Journal of Law Reform* 54, no 2 (2021): 283-329.
Haddaway, Neal R., Matthew J. Page, Chris C. Pritchard and Luke A. McGuinness. “*PRISMA2020* : An R Package and Shiny App for Producing PRISMA 2020-compliant Flow Diagrams, with Interactivity for Optimised Digital Transparency and Open Synthesis.” *Campbell Systematic Reviews* 18, no 2 (2022): e1230. https://doi.org/10.1002/cl2.1230.
Hagerty Media. “Hey, Massachusetts! You Can (Legally) Fix Your Cars Now.” February 13, 2025. https://www.hagerty.com/media/news/hey-massachusetts-you-can-legally-fix-your-cars-now/.
Hamadeh, Nada, Catherine Van Rompaey and Eric Metreau. “World Bank Group Country Classifications by Income Level for FY24 (July 1, 2023- June 30, 2024).” *World Bank Blogs*, n.d. Accessed December 20, 2024. https://blogs.worldbank.org/en/opendata/new-world-bank-group-country-classifications-income-level-fy24.
He, Shuhan, Debbie Lai and Jarone Lee. “The Medical Right to Repair: The Right to Save Lives.” *The Lancet* 397, no 10281 (2021): 1260–61. https://doi.org/10.1016/S0140-6736(21)00445-1.
Hernandez, Ricardo J., Constanza Miranda and Julian Goñi. “Empowering Sustainable Consumption by Giving Back to Consumers the ‘Right to Repair.’” *Sustainability (Switzerland)* 12, no 3 (2020): 850. https://doi.org/10.3390/su12030850.
Kilovaty, Ido. “Freedom to Hack.” *Ohio State Law Journal* 80, no 3 (2019): 455–520.
Kreiczer-Levy, Shelly. “The Consumer Bundle.” *Washington Law Review* 99, no 1 (2024): 163–99.
Lindgren, Lars, Aaron S. Kesselheim and Daniel B. Kramer. “The Right to Repair Software-Dependent Medical Devices.” *Journal of Law, Medicine and Ethics* 50, no 4 (2022): 857–59. https://doi.org/10.1017/jme.2023.28.
Lloveras, Javier, Mario Pansera and Adrian Smith. “On ‘the Politics of Repair Beyond Repair’: Radical Democracy and the Right to Repair Movement.” *Journal of Business Ethics*, May 15, 2024. https://doi.org/10.1007/s10551-024-05705-z.
Maitre-Ekern, Eléonore and Carl Dalhammar. “Regulating Planned Obsolescence: A Review of Legal Approaches to Increase Product Durability and Reparability in Europe.” *Review of European, Comparative & International Environmental Law* 25, no. 3 (2016): 378–94. https://doi.org/10.1111/reel.12182.
Manwaring, Kayleen. “Repairing the Third Wave of Computing.” In *The Cambridge Handbook of Emerging Issues at the Intersection of Commercial Law and Technology*, 1st ed., edited by Stacy-Ann Elvy and Nancy S. Kim. Cambridge University Press, 2025. http://dx.doi.org/10.1017/9781009279079.
Manwaring, Kayleen. “‘Slowing down the Loop’: Smart Devices and the Right to Repair.” *International Review of Law, Computers and Technology,* 38 (2024): 268-296. https://doi.org/10.1080/13600869.2024.2324535.
Medtronic. “MyCareLink Heart App.” Web page. February 1, 2025. https://global.medtronic.com/xg-en/mobileapps/patient-caregiver/cardiac-monitoring/mycarelink-heart-app.html.
Medtronic Australasia. “*Submission No DR186 to Productivity Commission,* Right to Repair.” July 23, 2021.
Nigama, Swayam. “Right to Repair: A Sustainable Solution for E-Waste Reduction.” *Jus Corpus Law Journal* 4 (2024): 301-311.
Ottobock. "Cockpit App." Version 2.9.0. Accessed March 12, 2025. https://corporate.ottobock.com/en/cockpit-app.
Permobil. "MyPermobil App." Version 1.74. Accessed March 12, 2025. https://www.permobil.com/en-au/products/power-wheelchairs/functions/mypermobil-app.
Permobil. “Permobil Service Manuals (AU).” Web Page. Accessed May 16, 2025. https://www.permobil.com/en-au/resources/resource-list?type=d5ee9ba6-5f1b-4310-9a2c-7c74548c718a.
Perzanowski, Aaron and Schultz, Jason. *The End of Ownership: Personal Property in the Digital Economy*. MIT Press, 2016.
Perzanowski, Aaron. *The Right to Repair: Reclaiming the Things We Own*. Cambridge University Press, 2022.
Perzanowski, Aaron, Chris Jay Hoofnagle and Aniket Kesari. “The Tethered Economy.” *George Washington Law Review* 87, no 4 (2019): 783–874.
Pickering, Catherine and Jason Byrne. “The Benefits of Publishing Systematic Quantitative Literature Reviews for PhD Candidates and Other Early-Career Researchers.” *Higher Education Research & Development* 33, no 3 (2014): 534–48. https://doi.org/10.1080/07294360.2013.841651.
Popov, Vladimir V., Elena V. Kudryavtseva, Nirmal Kumar Katiyar, Andrei Shishkin, Stepan I. Stepanov and Saurav Goel. “Industry 4.0 and Digitalisation in Healthcare.” *Materials* 15, no 6 (2022): 2140. https://doi.org/10.3390/ma15062140.
PRISMA Statement. “PRISMA 2020 Checklist.” Accessed January 6, 2025. https://www.prisma-statement.org/prisma-2020-checklist.
Quan, Yanmin and Xiaohao Zhang. “Outlook on the Right to Repair: How Will It Find Its Way into China’s Copyright Law?” *Journal of Intellectual Property Law & Practice* 18, no 5 (2023): 382–85. https://doi.org/10.1093/jiplp/jpad016.
Repair Café - Repairing for a Sustainable Future. “About.” Web page. Accessed December 16, 2024. https://www.repaircafe.org/en/about/.
Policy Lab Africa. *Right to Repair*. Web page. October 22, 2021. https://policylabafrica.org/rtr/.

Rimmer, Matthew. "*Submission No 42 to Treasury,* Mandatory Scheme for the Sharing of Motor Vehicle Service and Repair Information." The Treasury (Australian Government), November 2019.
Rimmer, Matthew. "*Submission No DR168 to Productivity Commission,* Right to Repair." July 23, 2021.
Rimmer, Matthew. "The Medical Right to Repair: Intellectual Property, the Maker Movement, and COVID-19." *Sustainability* 15, no 20 (2023): 14839. https://doi.org/10.3390/su152014839.
Rimmer, Matthew. "The Right to Repair: Patent Law and 3D Printing in Australia." *Scripted* 20, no 1 (2023): 130-202.
Rosborough, Anthony D. and Aaron Perzanowski. "Repair as Research: How Copyright Impedes Learning About Devices." *Michigan Technology Law Review* 30, no 2 (2024): 1-27. https://doi.org/10.36645/mtlr.30.2.repair.
Samuelson, Pamela. "Freedom to Tinker." *Theoretical Inquiries in Law* 17, no 2 (2016): 563–600.
SCImago. "SCImago Journal & Country Rank." Accessed December 20, 2024. https://www.scimagojr.com/.
Sparrow, Jeff. "Ending over Mending: Planned Obsolescence Is Killing the Planet." *The Guardian*, March 16, 2021. https://www.theguardian.com/commentisfree/2021/mar/17/ending-over-mending-planned-obsolescence-is-killing-the-planet.
Stanley, James. "Secrets of the Medtronic MyCareLink Patient Monitor." Blog post. *Incoherency*, December 4, 2016. https://incoherency.co.uk/blog/stories/medtronic-mycarelink.html.
Stryker South Pacific. "*Submission No 87 to Productivity Commission,* Right to Repair." February 1, 2021.
Subramanya, T. R. and Nidhi Saroj. "Is Right to Repair One's Own Good a Consumer Right? An Analysis of the Changing Dimensions of Consumer Rights in India." *International Journal on Consumer Law and Practice* 11 (2023): 182–99. Scopus.
Sutton, Anthea, Mark Clowes, Louise Preston and Andrew Booth. "Meeting the Review Family: Exploring Review Types and Associated Information Retrieval Requirements." *Health Information & Libraries Journal* 36, no 3 (2019): 202–22. https://doi.org/10.1111/hir.12276.
TechCentral. "Pressure on South Africa to Introduce 'Right to Repair' Rules." May 6, 2024. https://techcentral.co.za/south-africa-right-to-repair-rules/244111/.
Turiel, Joshua. "Consumer Electronic Right to Repair Laws: Focusing on an Environmental Foundation." *William & Mary Environmental Law and Policy Review* 45, no. 2 (2020): 579–600.
Tur-Sinai, Ofer and Leah Chan Grinvald. "Repairing Medical Equipment in Times of Pandemic." *Seton Hall Law Review* 52, no. 2 (2021): 461–506.
Urquhart, Lachlan D., Susan Lechelt, Melissa Terras, et al. "Creating Sustainable Internet of Things Futures: Aligning Legal and Design Research Agendas." *Companion Publication of the 2024 ACM Designing Interactive Systems Conference* (New York, NY, USA), DIS '24 Companion, July 1, 2024, 372–76. https://doi.org/10.1145/3656156.3658391.
US Food and Drug Administration. *Report on the Quality, Safety and Effectiveness of Servicing of Medical Devices*. Final Report. 2018.
U.S. PIRG Education Fund. *Stranded: Repair Restrictions Immobilize Wheelchair Users*. 2022. https://publicinterestnetwork.org/wp-content/uploads/2022/05/USPIRGEF_Stranded_June2022.pdf.
Velden, Maja van der. "'Fixing the World One Thing at a Time': Community Repair and a Sustainable Circular Economy." *Journal of Cleaner Production* 304 (2021): 127151.
Vogel, David. *Trading Up: Consumer and Environmental Regulation in a Global Economy*. Harvard University Press, 2009.
Wired. "We Need a New Right to Repair for Artificial Intelligence." November 26, 2024. https://www.wired.com/story/we-need-new-right-to-repair-for-artificial-intelligence/.
Wiseman, Leanne and Kanchana Kariyawasam. "Restoring Human Dignity: Some Reflections on the Right to Repair and Medical Devices and Assistive Technologies." *Griffith Journal of Law & Human Dignity* 10, no. 2 (2023): 1-17. https://doi.org/10.69970/gjlhd.v10i2.1246
Wiseman, Leanne and Kanchana Kariyawasam. "*Submission No 105 to Productivity Commission,* Right to Repair." February 8, 2021.
World Health Organisation. *Global Report on Assistive Technology*. 2022. https://www.who.int/publications/i/item/9789240049451.

Primary legal material

Australia

Competition and Consumer Amendment (Motor Vehicle Service and Repair Information Sharing Scheme) Act 2021 (Cth).
Therapeutic Goods Act 1989 (Cth).

Canada

Bill C-244, An Act to Amend the Copyright Act (Diagnosis, Maintenance and Repair), 1st Sess, 44th Parl, 2021.
Bill C-294, *An Act to Amend the Copyright Act (Interoperability)*, 1st Sess, 44th Parl, 2021.

European Union

European Commission. *Directive (EU) 2024/1799 of the European Parliament and of the Council of 13 June 2024 on Common Rules Promoting the Repair of Goods and Amending Regulation (EU) 2017/2394 and Directives (EU) 2019/771 and (EU) 2020/1828* (Text with EEA Relevance), CONSIL, EP (2024). http://data.europa.eu/eli/dir/2024/1799/oj/eng.

International

Agreement on Trade Related Aspects of Intellectual Property Rights*, Signed 15 April 1994, Entered into Force 1 January 1995*.

WIPO Copyright Treaty, *Opened for signature 20 December 1996, entered into force 6 March 2002.*

United States

Consumer Wheelchair Repair Bill of Rights Act, *6 Colo Rev Stat § Print (2022)*, Pub. L. Nos. HB22-1031.

Consumer Wheelchair Repair Bill of Rights Act: Hearing on HB22-1031 Before the H. Comm. on Public and Behavioral Health and Human Services, 2022 Sess. 75th Col. Gen. Ass. (statement of Colorado Bioscience Association) (2022).

Consumer Wheelchair Right to Repair, *8.5 Cal Business and Professions Code § 21300 (2024)*, Pub. L. No. SB-1384.

Critical Medical Infrastructure Right-to-Repair Act of 2020 (2020). https://www.congress.gov/bill/116th-congress/house-bill/7956.

Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, 86 Fed. Reg. 59627 (2021). https://www.govinfo.gov/content/pkg/FR-2021-10-28/pdf/2021-23311.pdf.

Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, 89 Fed. Reg. 85437 (2024). https://www.govinfo.gov/content/pkg/FR-2024-10-28/pdf/2024-24563.pdf.

Nevada Wheelchair Repair Act, AB 407, 83rd Leg, 2025 Reg Sess (Nev 2025).

South African Health Products Regulatory Authority. *Regulatory Requirements of Artificial Intelligence and Machine Learning (AI/ML) Enabled Medical Devices*. Pretoria: SAHPRA, September 2025.