Uncovering factors that influence electrical and electronic repair for Londoners

Executive summary of the ReCare project for policy makers I November 2024

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The ReCare project was a collaborative effort to explore how Londoners approach repair for their small household electrical and electronic devices in order to enhance repair opportunities and improve uptake.

The insights shared in this executive summary are based on a literature review and an online survey of 516 Londoners conducted by Imperial College in 2024 across London's boroughs. The technical report underlying this research is available upon request.

The ReCare project was funded by Challenge LDN and led by the London Borough of Barnet along with partner organisations LEDNet, London Councils' One World Living (OWL) and London Office of Technology and Innovation (LOTI) programmes, and ReLondon.

The project partners would like to acknowledge the support of local authority officers for helping to distribute the survey, as well as participants across the city for taking the time to share their insights.

Definitions

Electrical product: A device that uses electricity to perform a task or convert electrical energy into other forms of energy, such as a microwave, toaster, blender, kettle or hair dryer.

Electronic product: A device that stores, generates or transmits information in electronic form, such as a mobile phone, laptop, printer or earbuds.

Home repair: A self-driven process where a broken device is assessed and repaired e.g. DIY (Do-It-Yourself).

Predicted factor: Elements that influence decisions which may or may not mirror what participants report as having influence.

Professional repair: A service where broken devices are assessed and repaired for a fee.

Repair: Returning a faulty or broken product or components back to a useable state.

Repair events: A community-driven initiative where broken devices are assessed and repaired, such as Repair Cafes.

Repair factor: An element that influences positively (motivation) or negatively (barrier) an individual's interest in or ability to consider repairing.

Repair pathway: The sequence of steps going from the consideration of repair all the way to the outcome of a repair option pursued.

Self-selected factor: Elements that participants self-identify as having influence over their behaviour.

Introduction

Electrical and electronic products are an essential part of our daily lives. Londoners spend an estimated £3.3bn on electricals per year on 273,000 tonnes of devices[1]. At the same time, around £1.9 billion worth of repairable items in 2023 alone were discarded — an average of over £250 per adult in London[2]. This rate of consumption has an environmental impact, including the generation of up to 9% (almost 540,000 tonnes) of the emissions associated with goods in the city[3].

Repair extends a product's lifetime and helps to displace the purchase of virgin materials, thereby reducing emissions and other environmental harms associated with manufacturing new devices. However, citizens do not always consider repair as the first port of call and reusable devices, especially small household products, are often discarded before they have reached their end of life and may end up in the residual waste stream. In fact, almost half of electricals sent for recycling could be reused and an additional 10% are estimated to only need minor repairs[4].

With many people experiencing higher costs of living, repairing existing items can help residents save money whilst also supporting green local economies and community skills initiatives and improving London's sustainability and carbon footprints.

How does the ReCare project contribute to the solution?

The ReCare project looked to better understand how to increase the amount of repair taking place across the capital by assessing the user's journey. The objectives of the project were to:

1. Investigate Londoners' approach to repair across product types
2. Explore the barriers and motivations to repair by different demographic groups
3. Propose recommendations that will help to promote the uptake of repair.

This executive summary is an overview of the findings from a pan-London survey and provides insights that can help to inform future policies and programmes that reduce e-waste and improve reuse and repair for electronics and electricals. London's local authorities have an important role to play in promoting and enabling climate-conscious choices for citizens. The recommendations outlined build on the evidence and make the case for developing local initiatives that improve awareness, reduce costs, provide skill building opportunities and ensure access to tools across the capital.

1.ReLondon (2019). London's electrical sector, retrieved from ReLondon's website.
2.ReLondon (2024). London Recycles Repair Week, retrieved from ReLondon's website.
3. London Councils (2024). London's consumption-based emissions account, retrieved from London Councils' website.
4. Restart (2023) What a waste, retrieved from Restart's website.

Electrical product

A device that uses electricity to perform a task or convert electrical energy into other forms of energy, for example lamps, blenders, and kettles.

Electronic product

A device that stores, transmits or generates information in electronic form, for example computers, mobile phones and speakers.

London’s repair landscape

The ReCare project investigated Londoners’ response to existing services and infrastructure across the city. The three main 'routes' of repair explored in this research were professional services, home repair, and repair events. Examples of these routes are outlined on the right along with the underlying infrastructure that helps to support London’s repair landscape.

Supporting infrastructure encompasses a wide range of actors who provide a combination of both tangible and intangible functions. This includes the organisations, businesses and people that help to inform, enable and promote repair in London, such as academics who provide new evidence, campaigns that help to build awareness, media that help to celebrate and mainstream repair, and advocacy groups that boost access and push for systemic change.

These organisations, businesses and community groups shape and enhance London's repair landscape. Together, they not only help to reduce waste and emissions but also bridge the digital divide for families, schoolchildren and others, provide opportunities for skill building, and reduce costs for citizens.

While the city benefits from the wide range of offerings available[5], insights gathered by the London Councils' One World Living programme suggests that many Londoners do not have adequate knowledge about whether or how their items may be repaired, nor the information they need on how to conveniently access services.

It is crucial that the barriers identified in this research are, therefore, addressed. Particularly as London Councils’ annual poll on climate change suggests that while 26% of Londoners claim to already repair their electronics rather than replace them, an additional 62% report that they would also consider repairing their products[6], representing a significant opportunity for waste reduction.

5. ReLondon (2019). London’s Electrical Sector, retrieved from ReLondon’s website.
6. London Councils (2023). Londoners’ views on climate change in 2023, retrieved from London Councils’ webpage.

Professional repair

A service where broken products are assessed and repaired for a fee, such as through high street repair shops or retailers. In addition to providing repair, professional repairers may also help to build awareness for citizens.

Find local repair businesses through Recycle your Electricals

Home repair

A self-driven process where broken products are assessed and repaired by an individual. This requires citizens to have skills and access to tools. Increased uptake can also be supported through educational resources.

See IFIXIT's repair guides or visit your local Library of Things

Repair events

Community-driven initiatives where broken products are assessed and repaired either through pop-up repair events or in dedicated spaces. In addition to enabling repair, events also help to upskill citizens.

Learn how to repair at a Restart Party or visit the Fixing Factory

Supporting infrastructure

Repair is supported by a wide range of actors that help to build evidence, provide upskilling and training opportunities, advocate, promote, and celebrate repair in the media.

Learn new skills during Repair Week or check out Team Repair

Repair pathway

The ReCare research started by outlining the 'repair pathway', a sequence of four significant steps that are followed by citizens in response to a broken or malfunctioning product. Decisions are made at key points within this pathway that determine whether or not citizens will repair their broken items. The pathway was informed through a review of academic literature and describes the user journey for repair.

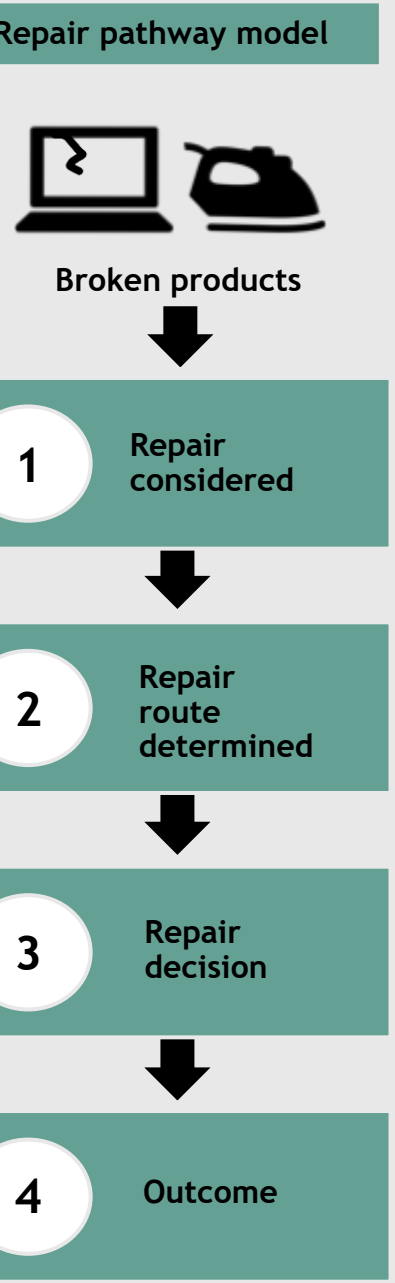
The four steps in the repair pathway are:

1. **Repair considered:** If a product breaks or malfunctions, citizens will consider in the first instance whether or not to repair their product along with potentially investigating details such as the amount of time it might take and how much it might cost.
2. **Repair route determined:** If repair *is* considered, the route is then determined. There are three routes that were explored as part of this research: home repair, professional repair, and repair events. Citizens will often undertake some research to help inform what route they select.
3. **Repair decision:** Once a route has been selected, citizens will decide whether to actually move forward with the repair.
4. **Outcome:** If citizens choose to move forward with their chosen repair route, the repair will then be attempted. If unsuccessful, it may result in an alternative repair route or a product replacement.

Across the repair pathway, there are also a number of factors, representing potential motivations and barriers that influence the decisions that are made at each stage. Through a pan-London survey, this research looked at 28 common factors which can be clustered under the following six broad categories[7]:

- **Consumer**: Relates to citizen's emotional connection, level of trust, attitudes, skills, experience and knowledge.
- **Product:** Relates to the product such as function, age, aesthetics, or repairability.
- **Infrastructure:** Includes access to spare parts, materials, and tools, availability of repair services and product manuals.
- **Value**: Relates to the cost of the original product and the repair. This includes any warranties, guarantees and insurance.
- **Data:** Looks at the relevance of repair in personal conversations or within media.
- **Principles:** Includes factors related to rules and regulations.

These categories of factors enable a systemic view of repair as they show that factors are not just centered on the citizen and the product but also concern infrastructure, values, access to information and other external principles. Further, the methodology used also provides insight into participants' 'self-selected' factors (influences directly identified by respondents) as well as 'predicted' factors (more 'subconscious' influences identified through the research), both of which affect each step of the repair pathway.



7. Zeeuw van der Laan A., Aurisicchio M., (2021). The flow mapper, Retrieved from the University of Limerick's website.

Step 1: Repair considered

The first step of the repair pathway covers citizens' initial response to a broken or malfunctioning product. The survey results found that two thirds (67%) of participants considered repair in the first instance. This suggests that Londoners are motivated to repair and aligns with previous research that found that 63% of owners of broken smartphones also considered repair[8].

Participants reported more cases of broken or malfunctioning electrical products (60%) than electronic products (40%), however were more likely to consider repairing their electronic products (75%) than their electrical products (61%). This is likely due to the fact that electronic products are often more valuable than electrical products and therefore may be seen as more worthwhile to repair.

40% of participants reported broken **electronic** items. The most common products were:

- Laptops
- Mobile phones

Electronics are more likely to be considered for repair.

60% of participants reported broken **electrical** items. The most common products were:

- Kettles
- Vacuum cleaners
- Toasters

Electricals are less likely to be considered for repair.

When asked what influenced their decision to consider repair, the following factors were identified by participants across both electricals and electronic products:

- Self-reported: Cost of repair is the top self-selected factor which influences whether repair will be considered.
- Predicted: Confidence in the repairability of the product is the top predicted factor which influences whether or not participants consider repair.

For the two-thirds of citizens that do consider repair for their products, they then move on to the second stage of the repair pathway.

8. Magnier L., Mugge R. (2022). Replaced too soon?, retrieved from Science Direct's website.

Repair pathway model

Broken products

1. **Repair considered**
2. **Repair route determined**
3. **Repair decision**
4. **Outcome**

When their product broke or malfunctioned, two-thirds of survey respondents considered repair in the first instance.

Step 2: Repair route determined

When determining which route to pursue, participants reported that they are most likely to choose professional repair services (45%) and home repair services (44%) whereas repair events were less frequently chosen (10%). Results also found that participants were most likely to consider home repair for their electrical products (48%) and professional repair for their electronic products (52%).

45% Professional repair

Main factors that influence the selection of this route:

- Self-selected: cost of repair, repairability, and function (condition and/or quality of the product).
- Predicted: availability of repair services, personal time taken, and knowledge on where to find services.

Most likely to be considered for electronic products

44% Home repair

Main factors that influence the selection of this route:

- Self-selected: repairability, repair cost, and cost of the original product.
- Predicted: access to tools, confidence in ability to repair, and attitude towards repair.

Most likely to be considered for electrical products.

10% Repair events

Main factors that influence the selection of this route:

- Self-selected: function, condition and quality of the product, repairability, and the cost of repair.
- Predicted: repair relevance in conversations and media, access to tools, and trust in repair services.

Please note that as the sample size for participants that selected the repair events route within this survey was small (37/516), caution is needed when interpretating these findings. Where possible, additional research on repair events has been added to help provide further context.

Repair pathway model

Broken products

1. Repair considered
2. **Repair route determined**
3. Repair decision
4. Outcome

When considering the different routes for repair, most survey respondents opted for professional repair or chose to repair at home.

Step 2: Repair route by demographic

The survey responses suggest that demographics play a role in what repair routes Londoners choose. In particular, income and age group were found to have some influence with home repair being favoured by older generations and professional repair being favoured by higher income earners.

Figure 1: Repair option consideration by income

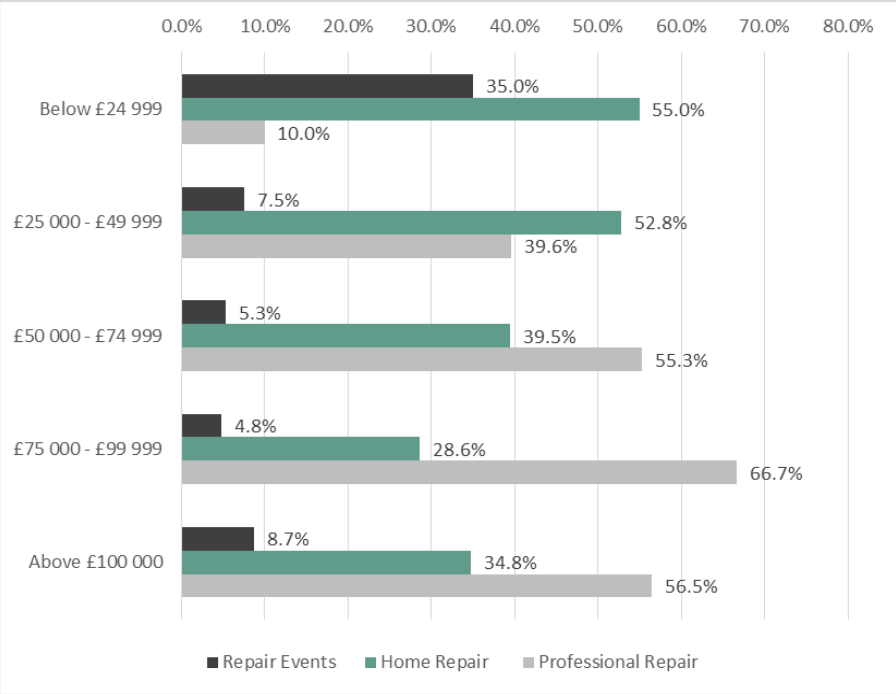
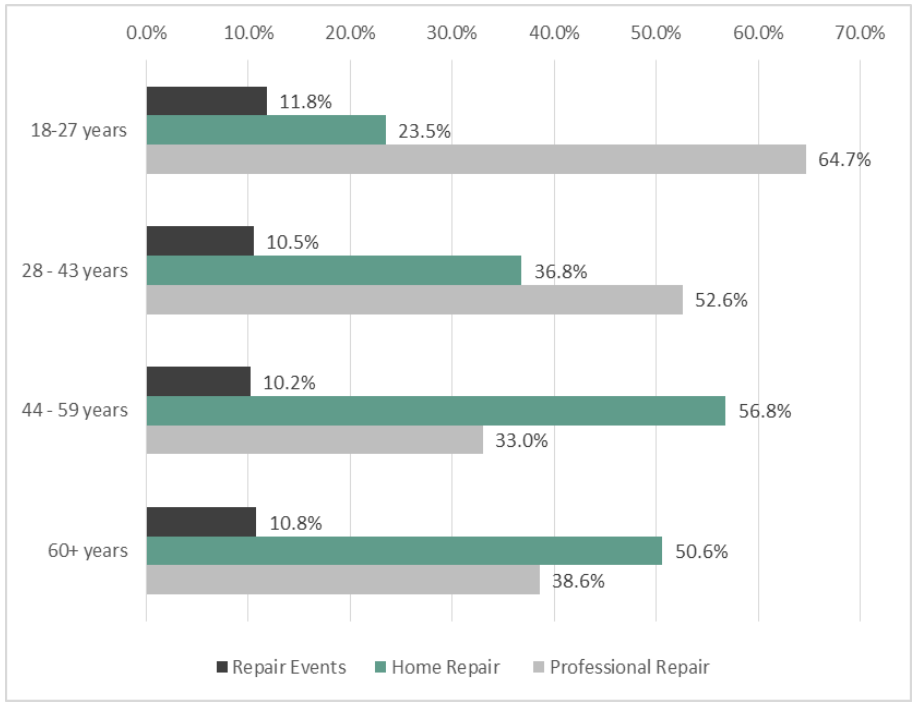


Figure 2: Repair option consideration by age group



These findings suggest that older generations may have the skills, time and resources to choose to attempt home repair. Londoners in lower income brackets may also opt for home repair or repair events, however this is likely due to it being a more cost-effective option. As income levels increased, respondents were less likely to consider repair events and more likely to consider professional repair.

Repair pathway model

Broken products

1. Repair considered
2. Repair route determined
3. Repair decision
4. Outcome

“Age and income were found to have a role in what repair route Londoners select, with home repair favoured by older generations and professional repair favoured by higher income earners.

Steps 3/4: Repair decision and outcome

Once a route has been selected, citizens will decide whether to move forward with the repair. Across all repair routes, the likelihood of moving forward was between 50-56%, representing the largest drop off point, and participants tended to repair their electronic products (56%) more than electrical products (49%). Further, whilst men and women were equally likely to consider repair, men were found to be more likely to move forwards (67%) with repair than women (50%) even though the majority of survey respondents (60%) identified as female. This is likely due to a mix of factors, for example cultural norms and education.

44-50%

Likely will *not* move forwards with the repair

Most common for electrical products.

50-56%

Likely *to* move forwards with the repair

Respondents reported that they attempted:

- Professional repair 50% of the time with an 87% success rate.
- Home repair 56% of the time with a 77% success rate.
- Repair event 52% of the time with an 81% success rate.

Most common for electronic products.

Respondents moved forward with repair approximately half of the time, however when actually attempted, repairs were successfully completed 82% of the time. The highest success rate was reported to be at repair events, although additional evidence caveats that rates vary. According to Restart's Open Repair Alliance dataset, 50% of repairs at Restart parties are successful and a further 25% of products are diagnosed as repairable.

Lamps (67%), laptops (58%) and vacuum cleaners (54%) were reported by Restart to be the most commonly fixed products and have a repair success rate of over 50%. Restart fixers noted that the top three barriers to repair were 'spare parts not available', 'no way to open the product' and the product being 'too worn out'[9]. Similarly, the One World Living programme has found that approximately a third of items were successfully repaired during repair events with a further third of products diagnosed as repairable.

Overall, the reported outcomes from the ReCare study indicates that success rates are high across the three repair routes and Londoners should take confidence in considering moving forward with their preferred repair route.

Repair pathway model

Broken products

1 Repair considered

2 Repair route determined

3 Repair decision

4 Outcome

Across all repair routes, participants reported successful outcomes suggesting that existing services are effective regardless of the route selected.

9. Restart (n.d.) Open Repair Alliance dataset, retrieved from the Open Repair website.

Factors that influence repair

Across the stages of the repair pathway, there are a number of factors that influence decision-making and may act as barriers or motivations to repair. These factors vary depending on the stage of the repair pathway and according to route.

Looking specifically at the point of consideration, the top factors that influenced whether participants thought to repair their broken or malfunctioning items in the first instance were:

- **Self-selected factors**: the cost of repair and the age of the product.
- **Predicted factors:** confidence in ability to repair and repair relevance in conversations and media.

The top factors that influenced whether participants moved forward with a particular repair route are outlined on the right. The results were the same across self-selected factors, differing only by level of prioritisation, while predicted factors were more varied.

The key factors across the entire repair pathway fell into the following broad categories:

- **Value factors:** 2/5 of the top self-selected factors were ‘value factors’, relating to the cost of the original product and the repair.
- **Product factors:** 2/5 of the top self-selected factors referred to the age, function and repairability of the product.
- **Consumer factors:** were most commonly identified amongst the predicted factors, including citizen's emotional connection, level of trust, attitudes, skills, experience and knowledge.

Top factors across repair routes

	Self-selected	Predicted
Professional repair	1. Repair cost 2. Repairability 3. Function - Condition and quality of the product 4. Cost of the original product 5. Environmental concern	1. Availability of repair services 2. Personal time 3. Knowledge on where to find services 4. Trust in repair services 5. Convenience
Home repair	1. Repairability 2. Repair cost 3. Cost of the original product 4. Function - Condition and quality of the product 5. Environmental concern	1. Access to tools 2. Confidence in ability to repair 3. Attitude to repair 4. Repair knowledge and skills 5. Repairability
Repair events	1. Function - Condition and quality of the product 2. Repairability 3. Repair cost 4. Cost of the original product 5. Environmental concern	1. Repair relevance in conversations or media 2. Access to tools 3. Trust in repair services 4. Repair cost 5. Repairability

Key findings and recommendations

Taking into account all the steps on the repair pathway, routes, and both self-identified and predicted factors, reoccurring factors of influence were:

- **Cost of repair:** The extent to which citizens perceives the price of the repair, potentially including spare parts, materials, labour, diagnosis and travel.
- **Repairability:** The extent to which both the product is designed to be able to be repaired and citizens are encouraged to repair, including easy disassembly and a lack of planned obsolescence.
- **Function (condition and quality):** The extent to which the product works as it did when it was purchased.
- **Cost of the original product:** The extent to which citizens understand the current price of a new product, including an assumption that it will approximate the initial price paid.

The cost of repair was a key factor of influence both in Step 1 during their initial consideration, and again in Step 3 where participants were highly influenced during their decision to move forwards with any repair route. Interventions that can support with lowering the cost of repair could therefore potentially reduce access barriers and improve uptake, particularly for low-income earners. Further research is needed to investigate and confirm.

Recommendations by key self-selected factors:

The survey results uncovered several factors that influence Londoners during key decision points across the repair pathway. To improve the amount of repair taking place across the city, the following recommendations have been developed that address the top and second ranked factors by stage.

Self-selected factors	Step1: Repair considered	Steps 2 and 3: Decision to move forward by repair route:			Recommendations
		Professional services	Home repair	Repair events	
Repairability		Second priority (2)	Top ranked (1)	Second priority (2)	Help understand repairability by: ➢ Signposting to remote diagnosis services. ➢ Help citizens understand factors involved in repairability such as disassembly, cost of repair, and the diagnosis process.

Most common factors

Across both self-selected and predicted findings:

- **Cost of repair**
- **Repairability**
- **Function (condition and quality)**
- **Cost of the original product**

“

Interventions that lower the cost of repair could potentially reduce barriers and improve uptake.

Self-selected factors	Step 1: Repair considered	Steps 2 and 3: Decision to move forward by repair route:			Recommendations
		Professional services	Home repair	Repair events	
Repair cost	Top ranked (1)	Top ranked (1)	Second priority (2)		Help understand and reduce repair cost by: ➢ Supporting residents to understand if repair is worthwhile and which repair option is best. ➢ Subsidise repair costs to incentivise repair over the purchase of a new product.
Age of the product	Second priority (2)				Help reduce barriers surrounding product age by: ➢ Encouraging citizens to focus primarily on whether the product has the potential to function rather than just the age.

Recommendations by key predicted factors:

Predicted factors	Step 1: Repair considered	Steps 2 and 3: Decision to move forward by repair route:			Recommendations
		Professional services	Home repair	Repair events	
Confidence in ability to repair	Top ranked (1)		Second priority (2)		Help build repair competence by: ➢ Supporting cross-demographic communities willing to share their knowledge and skills. ➢ Developing education/training programmes and hosting events to improve repair skills. ➢ Develop industry/academic partnerships.
Repair relevance in conversations and media	Second priority (2)			Top ranked (1)	Help grow public debate on repair by: ➢ Launching and supporting repair campaigns. ➢ Identifying repair promoters in the local community. ➢ Communicating the enjoyment of repair.

Case study: The Fixing Factory

The Fixing Factory is a workshop based in Camden that hosts hands-on sessions to tackle e-waste.

Weekly drop-in sessions allow people to work alongside skilled volunteer fixers to get broken items up and running again – no skills required.

They also offer fixing courses, online through learning modules as well as repair crash courses and a Project Night for experienced fixers to use the workshop and its extensive equipment.

Learn more by visiting the Fixing Factory.

Predicted factors	Step 1: Repair considered	Steps 2 and 3: Decision to move forward by repair route:			Recommendations
		Professional services	Home repair	Repair events	
Access to tools			Top ranked (1)	Second priority (2)	Support access to tools by: ➢ Providing access to repair resources, including tool kits and spare parts.
Availability of repair services		Top ranked (1)			Make access to repair services easier by: ➢ Supporting the development of repair services in underrepresented areas. ➢ Ensuring directories of local repair businesses are easy for residents to find.
Personal time taken		Second priority (2)			Reduce time taken by: ➢ Supporting services that make repair more convenient such as mailing repair products to repairers or sending repairers to consumers' homes. ➢ Streamlining repair process to ensure efficient repair services and reduce time spent.

Local authorities can help to reduce the barriers to repair and ensure that repair is accessible and prioritised by residents. Examples of actions that can be taken to address the key factors identified include:

- **Reducing the cost of repair:** Facilitating a Restart repair party or regular repair cafés to offer citizens low or no cost repair services or subsidising the cost of repair through a repair voucher scheme.
- **Promoting the importance of repair:** Providing opportunities for people to learn more about repair, promoting campaigns such as Repair Week, and connecting with universities and colleges to develop further education programmes and initiatives.
- **Improving access to repair services:** Supporting high-street repair services, such as subsidising business rates (e.g. Sutton Go Green).
- **Improving awareness of repair:** Promoting existing repair maps and search tools (e.g. Restart's repair directory) and signposting at-home device repair services that increase the convenience of repair (e.g. Repatch).
- **Improving access to tools and knowledge sharing:** Raising awareness of toolkits and repair guides to give Londoners confidence to repair at home (e.g. iFixit toolkits); signposting to manufacturers' remote diagnostic services; setting up or promoting a local Library of Things; and developing, offering and subsidising adult learning course in electrical repair through digital skills hubs.

Case study: The Walthamstow Tool House

The Tool House is a unique community workshop concept that offers individuals the opportunity to access a fully equipped workshop at an affordable fee.

The Tool House is an accessible and inclusive space for people to learn new skills, create and collaborate.

The space offers electronics as well as woodworking, 3D printing facilities and more.

Learn more by visiting the The Tool House.

Conclusion and next steps

The ReCare project aimed to investigate Londoners' approach to repairing small household electrical and electronic products, and to explore the barriers and motivations to repair by different demographic groups. This was assessed through a pan-London survey taken by over 500 individuals across the city.

The results found that two thirds of participants considered repairing their malfunctioning or broken products which suggests that there is appetite for repair by citizens in London. The dominant preference for repair routes were professional repair services and home repair. Professional repair services were used mostly by higher income earners while older participants favoured home repair. Individuals in lower income brackets tended to primarily consider repair events and home repair. Although more cases of electrical than electronic products were reported, participants were more likely to move forwards with repair of electronic products.

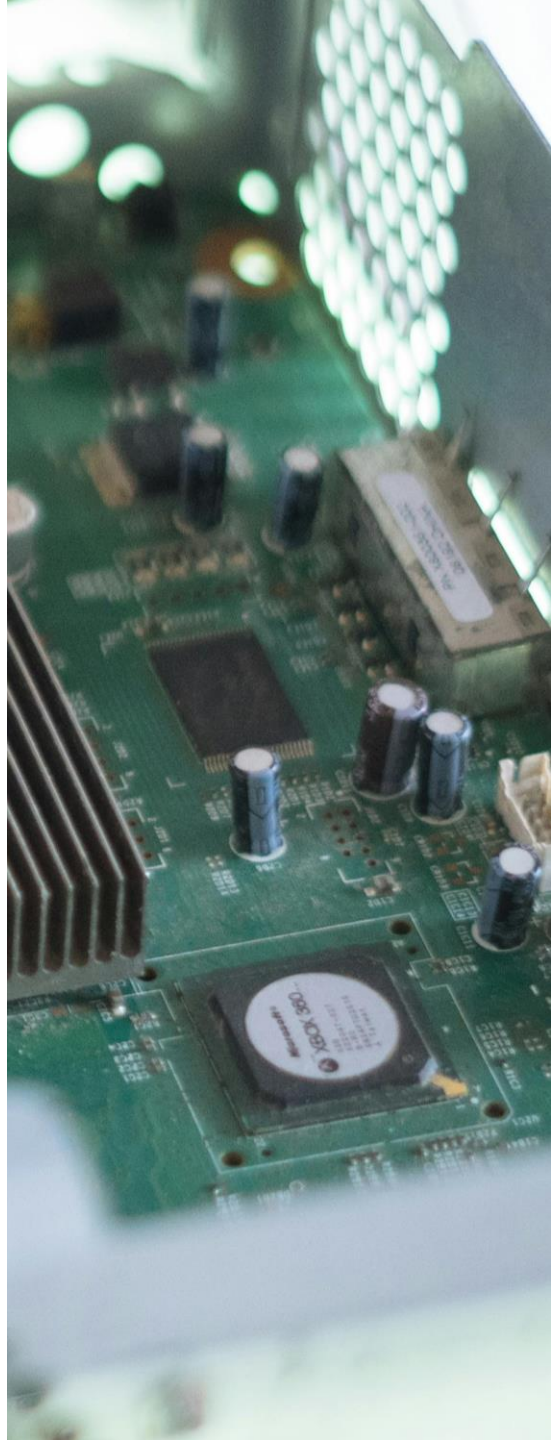
Analysis of participants' responses predicted and prioritised a mix of tangible and intangible repair factors that influence decision making, which centred on consumer and infrastructural factors (e.g. confidence in repair ability, availability of repair services and access to tools), while participants self-selected responses focused more on the product (e.g. repairability) and value (i.e. repair cost).

These findings were used to develop recommendations for local authorities that will help to promote the uptake of repair. Key areas of action include reducing the cost of repair, promoting the importance of repair, improving awareness of repair service and access to repair, tools and knowledge sharing.

Next steps and future research

Additional research is needed to pinpoint key strategies for how to build awareness of available services and infrastructure in London. For example, availability and accessibility could be mapped and scored for each region to determine whether there is a sufficient level of services, and whether access to services influences the uptake of repair. Further, assessing how to reduce cost barriers at a local or pan-London scale is needed to ensure that all Londoners can benefit and access repair services.

It is crucial that London and its boroughs continue to work collaboratively to build additional evidence and trial new initiatives, programmes and campaigns to ensure that repair is the first port of call. This will have direct benefits as it will support residents who are facing the cost-of-living crisis, help to build green local economies, enhance community skills, and improve London's sustainability and carbon footprints.



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8. Magnier L., Mugge R. (2022). Replaced too soon?, retrieved from Science Direct's website.
9. ReStart (n.d.). Open Repair Alliance dataset, retrieved from the Open Repair website.

Further reading

- ReLondon's London's Electrical Sector report provides a review of current activity in London and good practice across Europe to accelerate the circular economy in the electricals sector, including recommendations for public actors and electricals stakeholders across London. Read the report here.
- The One World Living programme is one of London Councils' Climate Programme themes. Its goal is to reduce consumption emissions across London by focusing on food, textiles, electricals and plastics. See the One World Living programme's action plan for electricals here.
- The London Office of Technology and Innovation is London local government's collaborative innovation team. Learn more about the digital inclusion programme Get Online here.

Learn more

To learn more about the research or to request access to the technical report, please contact Marco Aurisicchio and Elliot Latham from the Dyson School of Engineering at Imperial College London.

Get in touch