Circular Metals Case Study:

Repair of small/large appliances

1. Introduction

This case study links together WP2 (Circular Technology), WP3 (Circular Business) and WP4 (Circular Economics & Society) in the Interdisciplinary Centre for Circular Metals. It also links to work being carried out by the Circular Economy Centre for Technology Metals and by NICER funded SMEs (Tech-TakeBack, Restart). We focus on the opportunities to increase circularity of metals in small & large electrical appliances through increasing the life of those products via repair and reuse. This case study is a systems analysis that represents a synthesis of the results of different work packages and research projects to highlight the barriers and opportunities to increased metals circularity. We have help workshops with stakeholders (BEKO, TakeBack, Restart) and policymakers (DEFRA).

2. Background

Electronic waste is one of the fastest growing waste streams globally, comprising 53.6 million metric tonnes in 2019, and projected to grow to 74.7 million metric tonnes (UNITAR, 2020; World Health Organization, 2021). In the UK the current Electrical and Electronic Equipment (EEE) market is largely a linear one, with 55% of EEE items placed on the market being lost from alternative circular routes such as reuse, repair, remanufacture, or recycling, instead going to landfill, incineration or dumped overseas (House Of Commons Environmental Audit Committee, 2020). It is forecasted that the UK will generate the highest amount of WEEE per capita globally by 2024 (House Of Commons Environmental Audit Committee, 2020; Green Alliance 2020).

According to the UN, the metals and critical materials contained in the total global volume of electronic waste was worth an estimated $57 billion, the majority of which was lost from use (UNITAR, 2022). Recycling rates for electronics in the UK are low at 111,400 metric tons in 2022 (Statista, 2022). Recycling processes for electronics largely involve shredding and sorting products, which reduces the value of critical materials they contain such as copper, aluminium, steel, gold, silver, and platinum, and critical raw materials like cobalt (Green Alliance, 2020). Keeping electronic products in use for longer through reuse and repair can keep products and materials at their highest value and slow down consumption rates.

3. Systems Analysis

Our key insight is that repair is an outcome of a system of interconnected activities and not an isolated individual action [1]. To repair a washing machine, a smart phone or kettle requires a system of provision of equipment, spare parts, skilled labour, repair information, supportive legislation and an economic opportunity. If any of these are lacking repair becomes difficult or impossible and circularity of the metals in the product is reduced. The provision of the repair system requires support from global, national, and local actors and legislative frameworks, see Figure 1 [1].

In this case study we acknowledge wider definitions of a repair economy (Rinkinen et al, 2023) alongside existing policy and regulation aimed at tackling the barriers to repair ('Material Efficiency', 'Ecodesign' and 'Right to Repair'). We build upon existing work done to assess and highlight technical and policy barriers to repair in the EU (European Commission, 2022), and in the UK (Green Alliance, 2023. We frame the discussion of the interactions of key actors and policies in the UK repair system under the themes of:

1. 'Designing, making and selling repairable products' (Trade policies, Extended Producer Responsibility, Intellectual Property Law, VAT, Standards and Certification, Health & Safety, Consumer Protection Law, Design skills for repair, Business rates);

2. ‘Identifying and collecting repairable products for reuse and repair’ (Environmental policies and targets, Life Cycle Assessment, WEEE Regulations, Ecodesign ‘Right to Repair’ Regulations, Repairability/Durability Indexes, Local reuse and repair services);
3. ‘Repair services, skills and education’ (Skills and education policies, Training standards & certification, local repair training services, Business Models, Green Public Procurement).

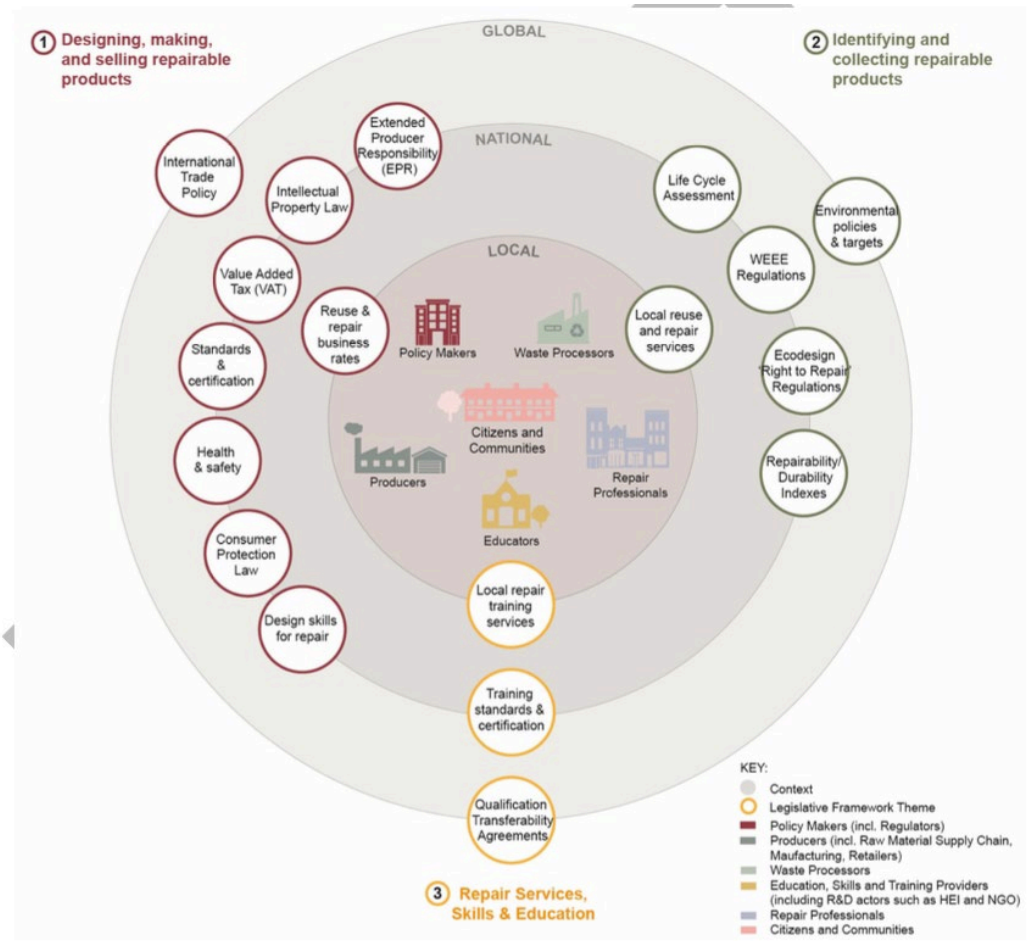

Figure 1. Illustration describing the global, national and local relationships between policy and technical instruments in 1) Design, making, selling repairable products 2) Identifying and collecting repairable products 3) Repair services, skills and education [1].

4. Summary & Conclusions

Growing a successful UK repair economy will rely on addressing the needs of global, national and local relationships between policy and industry and supporting their interactions via coordinated policy and regulation. Mapping the interactions and articulating the barriers and opportunities is the key to success. The UK Government have recently announced a resource strategy aligned to this [2] and the recent announcement of a UN-backed centre for circular economy research has repair/reuse as a central part of its greener future agenda [3].

References:

1. Danielle Purkiss, Polina Pencheva, Beth Munro, Mark Miodownik; *A systems approach towards growing the UK electronics and appliance repair economy*, submitted to Frontiers in Sustainability.
2. https://www.gov.uk/government/news/new-programme-to-drive-better-reuse-of-resources-and-increase-recycling
3. https://www.gov.uk/government/news/uk-to-establish-worlds-first-un-backed-centre-for-circular-economy-research