FAN CIRCULARITY

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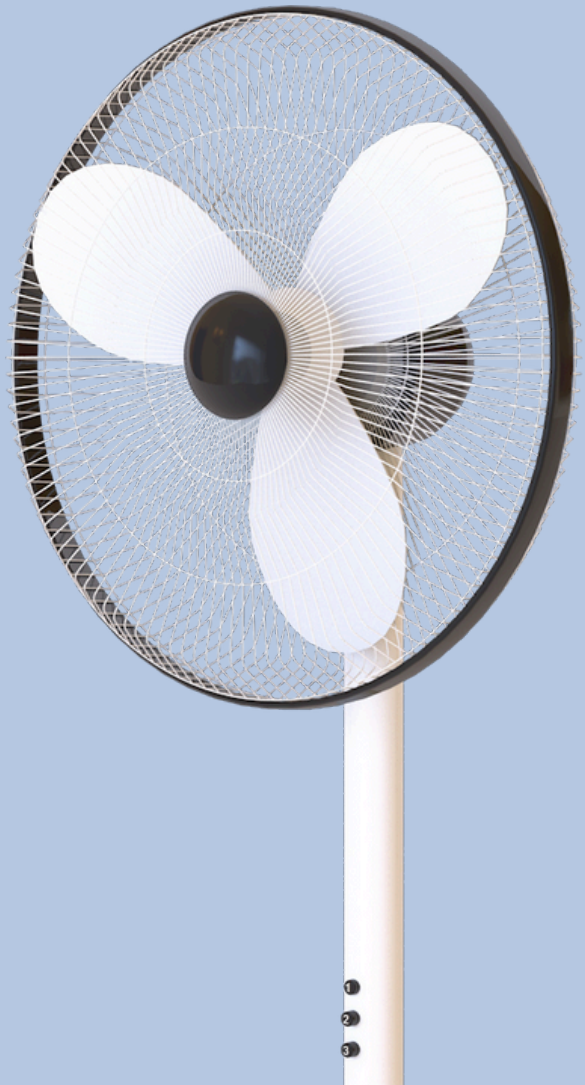
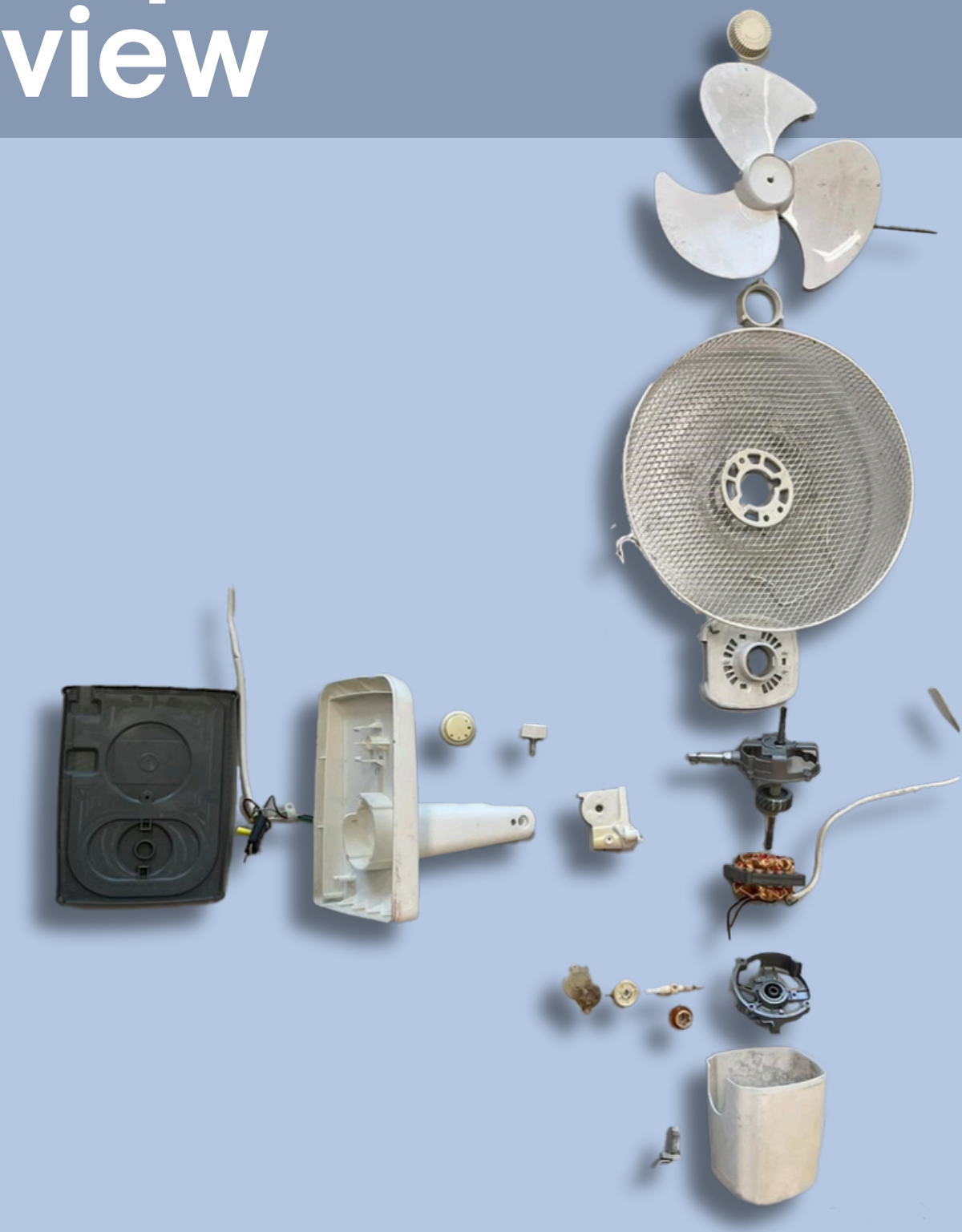
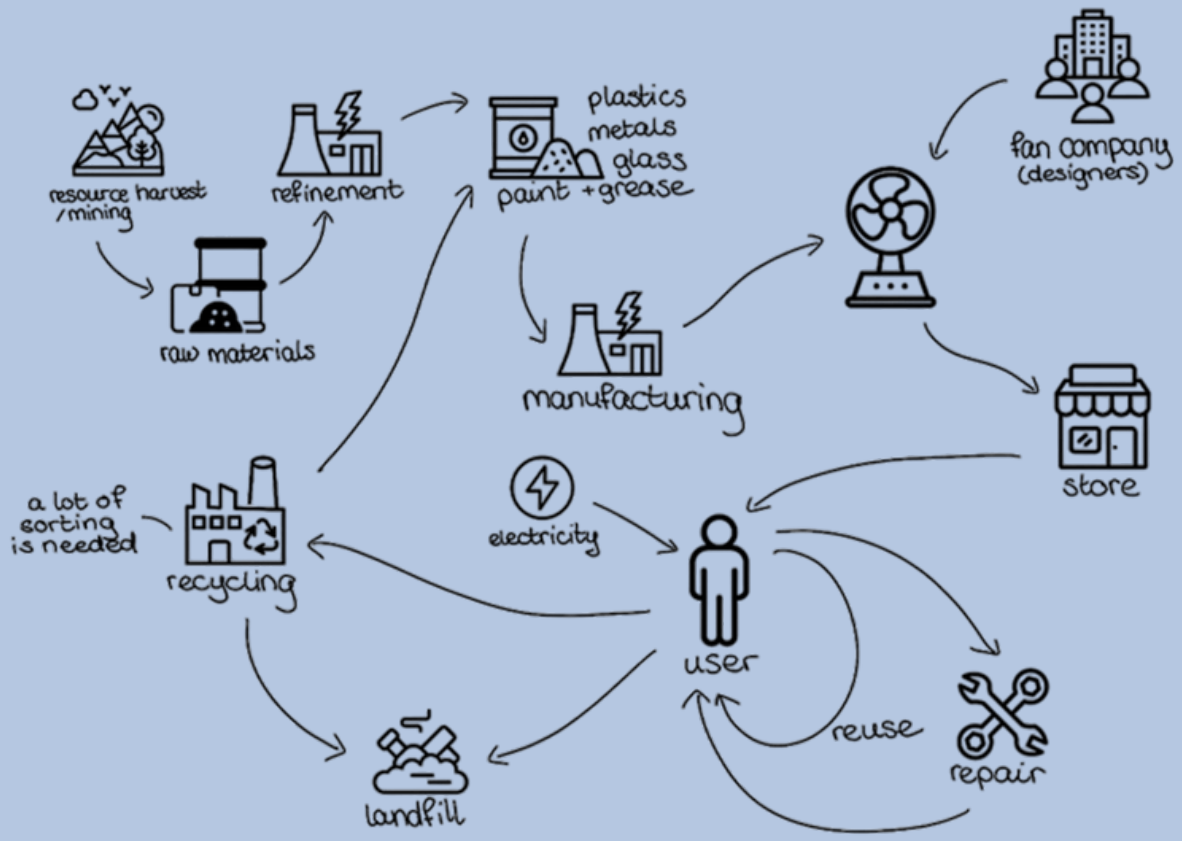


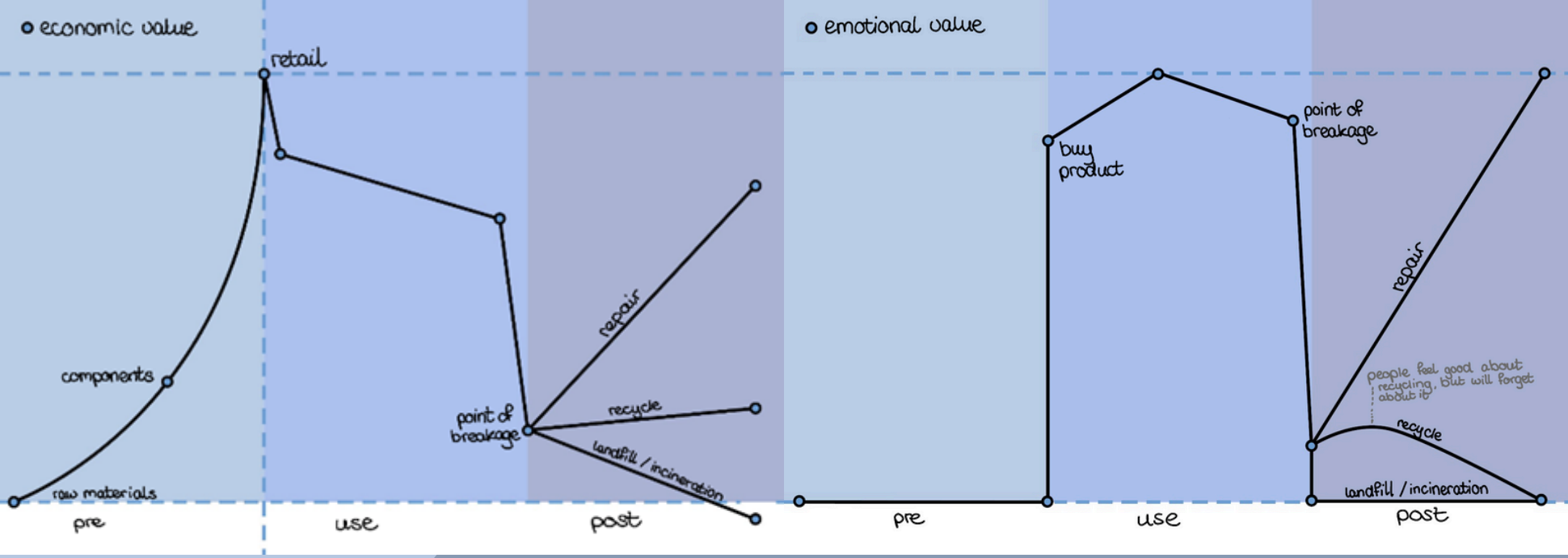
Exploded view



Analysis

The analysis of our fan, using system mapping and a value analysis has identified key areas for improvement in terms of circularity. By analysing our current map, we identified that a lot of materials ends up in landfills or incineration. Furthermore their limited repairability leads to premature disposal (Boix Rodríguez & Favi, 2023), and insufficient durability. These are all challenges that can be addressed through a circular approach, focused on extending the fan's lifespan and reducing waste.





Value analysis

The value analysis provided us with additional insights. From our assessment, it appears that when fans break down, they are often discarded rather than repaired, mostly due to their internal complexity (Darby & Obara, 2005). This strengthens the need for improvements on the design, emphasizing durability, modularity and recyclability. Current fan models lack these aspects, negatively contributing to the short-lived products and increased waste.

Proposal

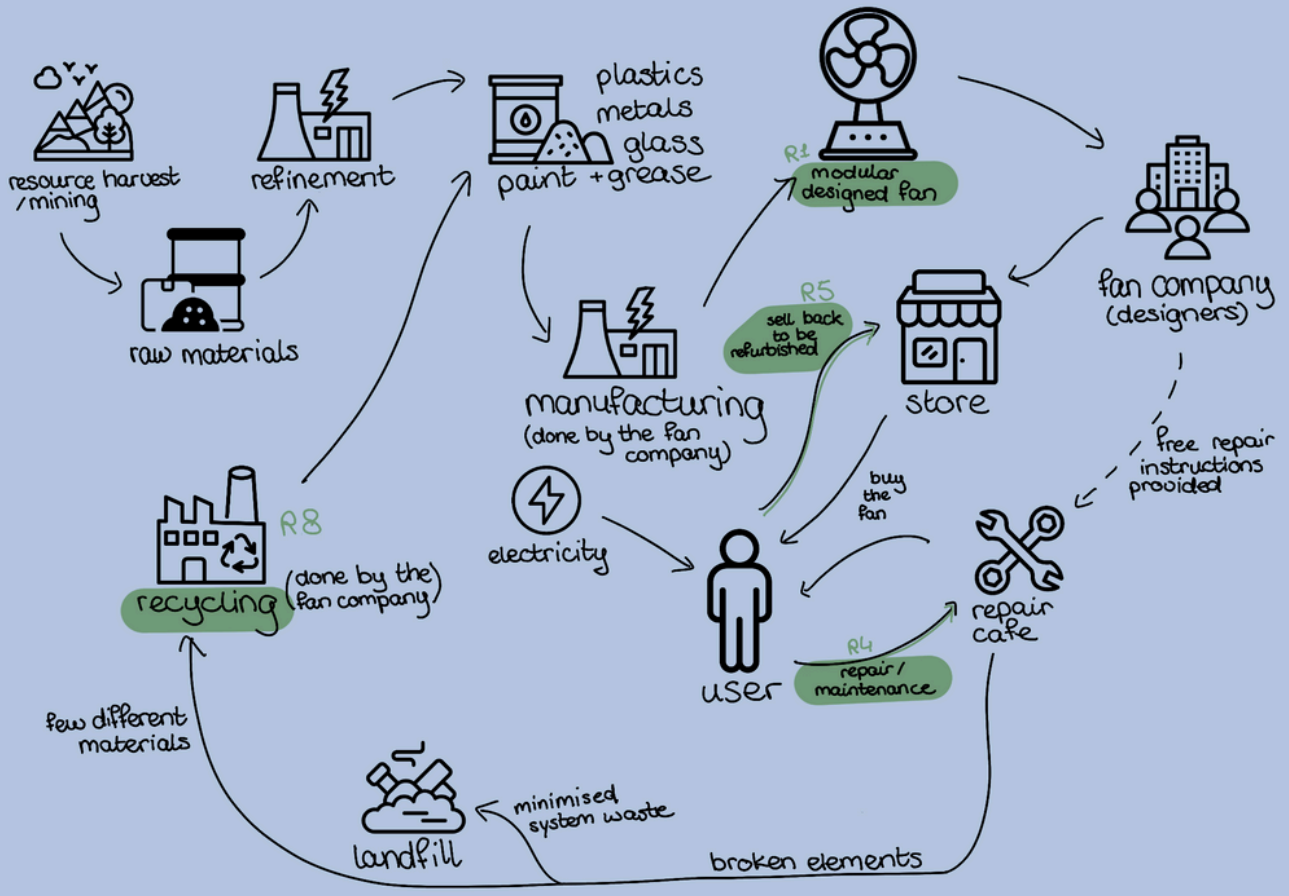
After assessing the range of circular strategies suggested by Ellen McArthur Founation (n.d.), we decided that focusing on a closed loop/take back and modularity would best benefit our product. Redesigning the system in this way utilises the R strategies: rethink (R1), repair (R4), refurbish (R5), and recycle (R8). In designing this new model, we assumed that the system is based in the Netherlands and that the demand for desk fans is constant within seasons.

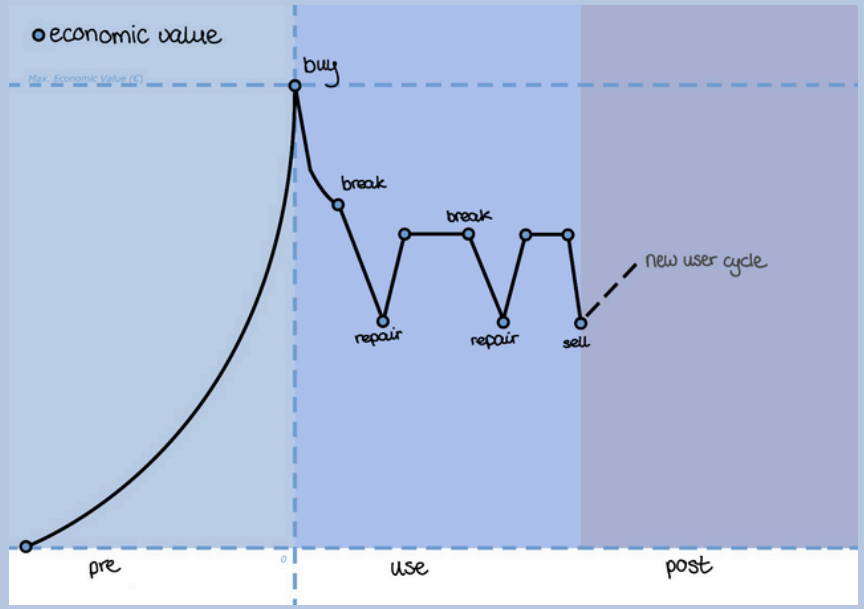
R1: Fans are redesigned to be modular. The organisation sells these modular parts and refurbished fans alongside new models.

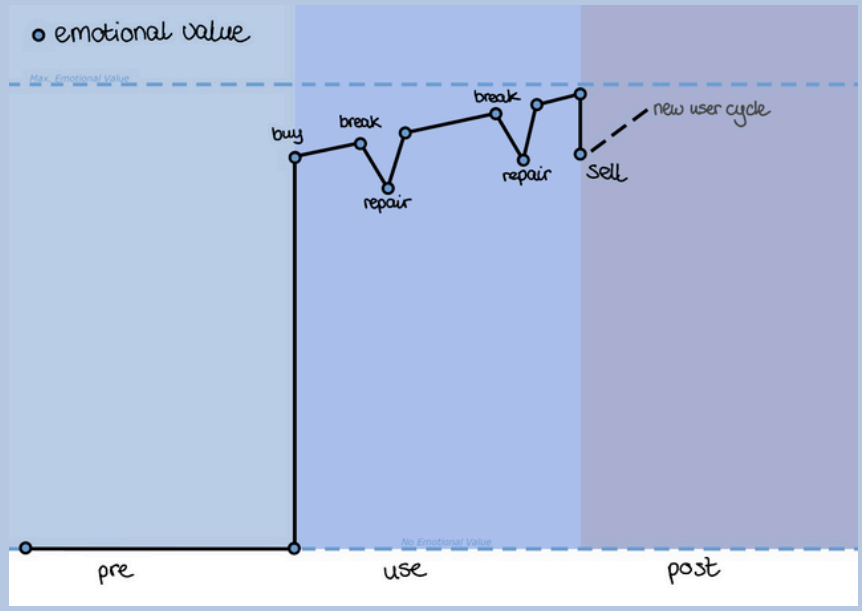
R4: Consumers can easily repair their own fan due to a modular design.

R5: The organisation will buy back fans/fan parts for refurbishment and resale.

R8: Broken parts get returned to the organisation, then recycled and fed back into production.

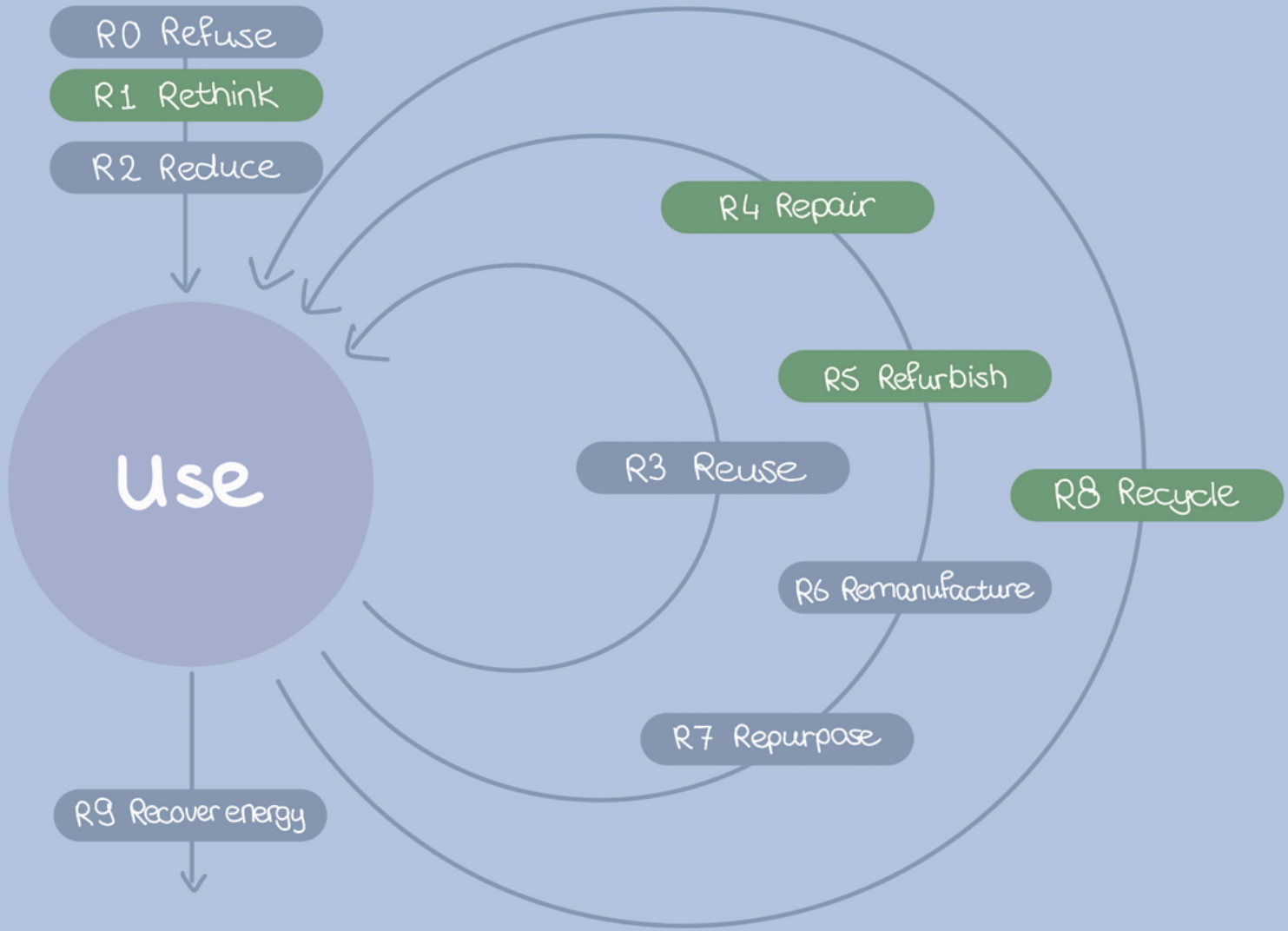






New Value Mapping

Circular Economy



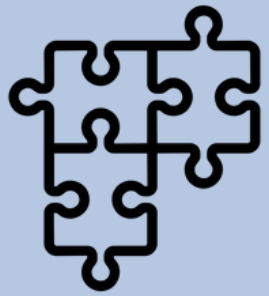
R strategies:
Our opportunities

	R0 Refuse	Customers do not necessarily need a fan. They can also take a cold drink a go for a swim to cool down.
	R1 Rethink	A heating element can be added so two products are combined as one. Or a more modular design for better repairability.
	R2 Reduce	The fan could be made out of less different materials and recycled materials can be used for creating the plastic stand.
	R3 Reuse	Selling the fan to a next user or making a fan service would be more optimally used until the end of its life cycle.
	R4 Repair	Both repairability and modularity could be improved. It should be considered whether the user or a professional should repair the product.
	R5 Refurbish	To extend the life of the fans, they could be refurbished. The fan could be repainted and components could be replaced.
	R6 Remanufacture	Functioning parts of multiple fans can be combined to make a fan that is completely functional.
	R7 Repurpose	The parts of a fan are so specific that repurposing elements would be very hard.
	R8 Recycle	If old fans would be recycled by the fan company itself, a lot of waste and energy can be saved in sorting and remelting plastics.
	R9 Recover	Incineration with energy recovery.

Opportunity

Service (R3)

Renting a fan for more reuse



Modularity (R4)

Modular Design increasing repairability

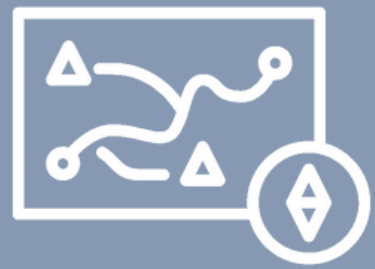
Materials (R2)

Using fewer different materials

Functionality (R1)

Adding a heating element

Opportunity Exploration



We first explored incorporating a **product as a service** model, which entailed R strategies R1-rethink, R4-repair, and R8-recycle. We planned for the organisation to handle maintenance and repairs of the product in the off-season, and for the faulty/worn parts to be recycled back into production in a closed loop. Overall, we felt this opportunity had potential, but were advised by Accenture (J. Kanters, A. Ville, personal communication, February 18th, 2025) that the need for professional-level repair as part of the service meant an overreliance on logistics within the system, as entire fans needed to be transported at the start/end of each season. This led us to the development of our final model, which instead prioritised consumer-level repair. We also explored:

Embedding intelligence
We all agreed that a desk fan wouldn't benefit much from embedded intelligence, and that this would complicate its production and repair/refurbishment processes, making it less sustainable.

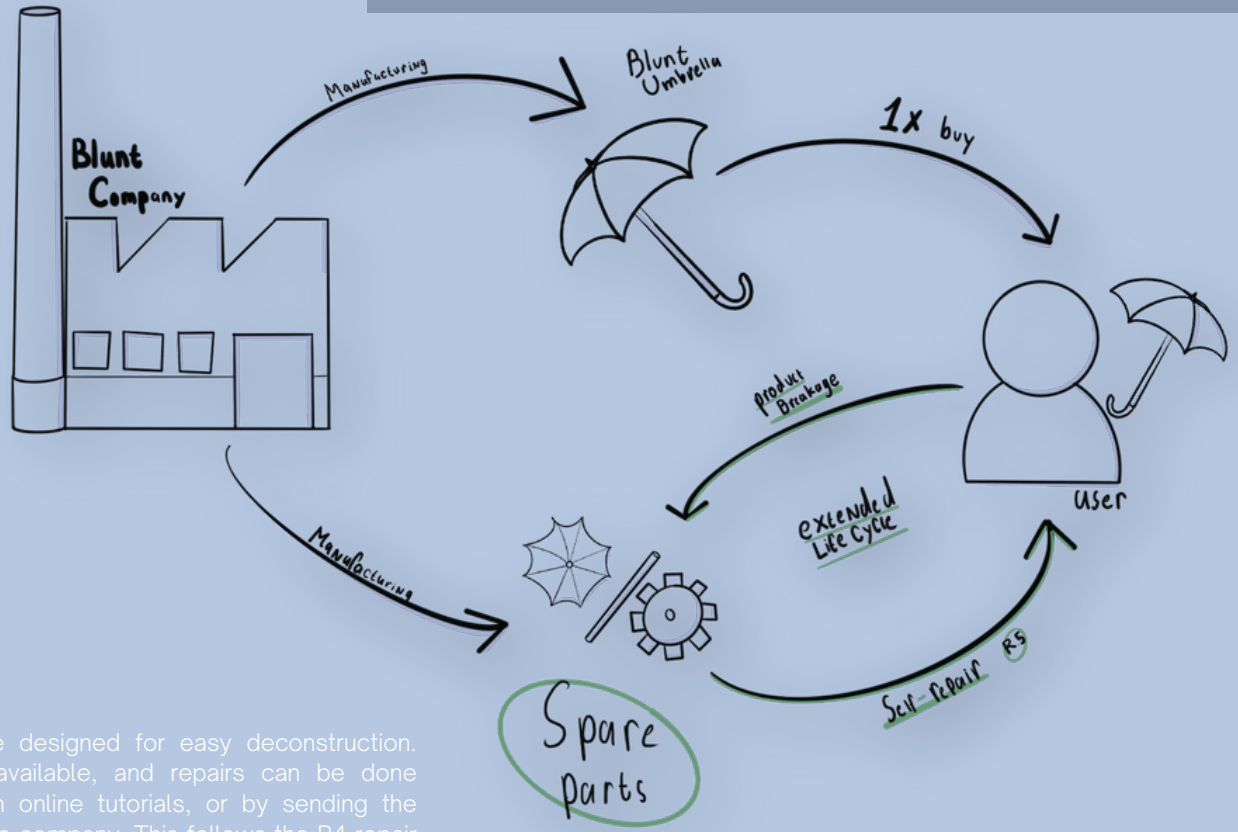
Product Life Extension + Smart Material Choices
Whilst we haven't specifically focused on these circular elements, they are still used within our chosen strategies. We have extended the life (cycle) of the fan by enabling consumer repair, as well as professional refurbishment. For our product to better withstand the stresses of repair and refurbishment, we chose to use metal instead of plastic for parts vulnerable to breakage, such as the fan blade. We also opted to avoid or at least minimise the use of paint for the easier recycling of parts.

Extending Function
We discussed integrating the function of the desk fan into a product that provides more value to the user. We thought that the fan might be able to produce hot as well as cool air, functioning as a portable heater as well. Whilst this idea had merit, we chose not to pursue it as we agreed that this function is already provided in most homes adequately by central heating systems or similar.

Best practice: Blunt Umbrellas

Blunt Umbrellas

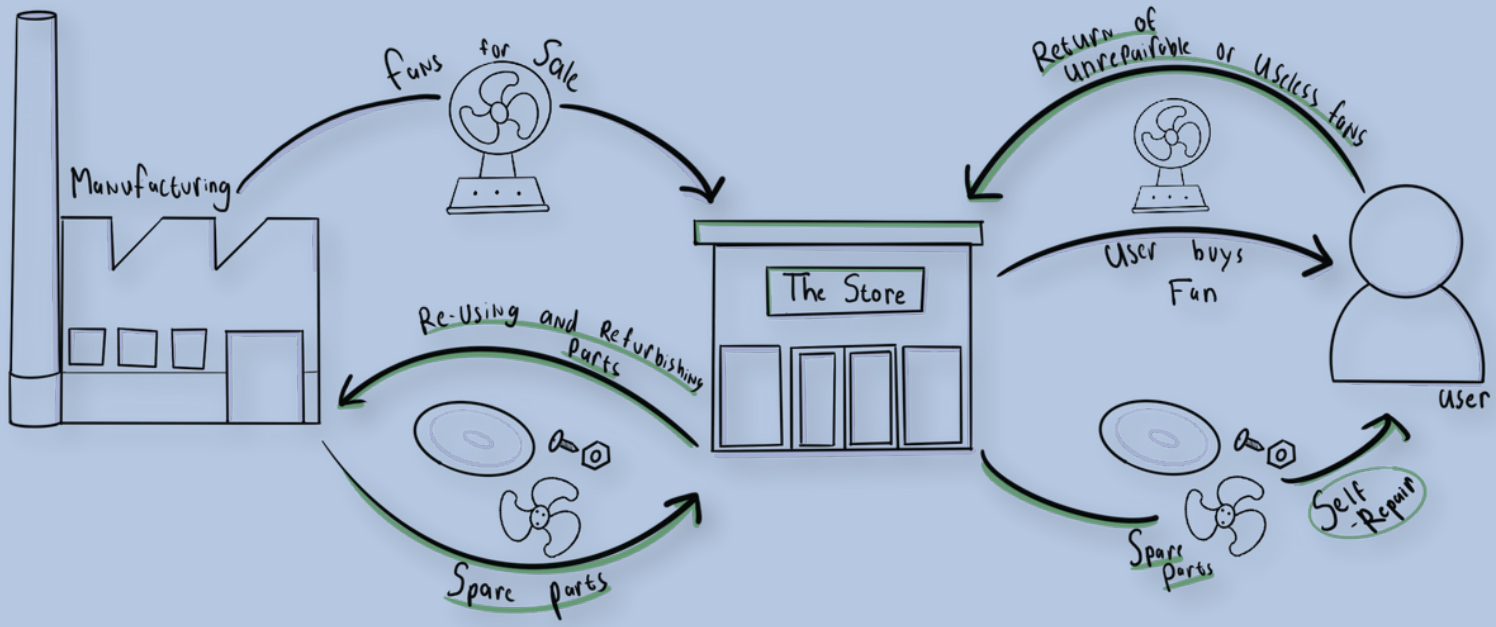
As a test of the feasibility of our proposal, we looked at similar current real world applications. **Blunt** aims to create well-built and long-lasting umbrellas that have fashionable design. Their mission is to promote the use of reusable products, offering multiple ways of repair instead of replacement (Blunt, 2025).



The umbrellas are designed for easy deconstruction. Spare parts are available, and repairs can be done independently with online tutorials, or by sending the product back to the company. This follows the R4 repair strategy, though it is unclear what happens with the broken parts.

Best practice:
Blunt Umbrellas

Adapting the system for our fan



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