

Study on repair of Coffee makers

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27.6.2022

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1. Introduction

The type of appliance "coffee maker" was chosen for this study because it is one of the most repaired appliance, as can be seen from the data collected at events organised by the Repair Café Canton Zug as well as from worldwide Repair Monitor data¹.

Coffee makers are interesting from a repair point of view. This is particularly the case because the following factors lead to high wear and tear or maintenance requirements of the machines:

- Moving parts
- Water in the appliance
- High temperature and pressure in the unit
- Product (coffee) contains fats
- Electronics in humid, hot environments

In addition, there are essentially two very different types of coffee makers, capsule machines and fully automatic machines, which differ greatly in terms of technology and price.

2. Data collection

In this repair study, it was determined whether a repair is possible, whether spare parts are necessary and available and whether special tools are required. In addition, specific obstacles to repair were noted.

Brand	Free text
Type	Free text
Problem description by customers	Free text
Detected defect	Free text
Maintenance problem of the customer	yes, no
Maintenance obstacle for customers (design defects)	yes, no
Work carried out by the repairer	Free text
Estimated time requirement for specialist	[h]
Repair success	yes, no
Time required for better design	Estimated [h]
Spare parts what needed	Free text
Spare part from where	Free text
Spare part costs	[CHF]
Costs decalcification / cleaning	[CHF]
Comments	Free text

Table 1: Recorded repair data

Within the framework of the repair service offered by the association Repair Café Canton Zug, it was possible to collect information and data in the period of May 2021-May 2022 (cf. Table 1) on the repair of 45 coffee makers.

¹ www.repairmonitor.org

3. Analysis of the data

45 coffee makers were attempted to be repaired. These were 16 fully automatic machines, 25 capsule machines, 2 portafilter machines using Nespresso capsules and 2 portafilter machines, each from different manufacturers. For the analysis, the 2 portafilter machines using Nespresso capsules and the portafilter machines were grouped together with the capsule machines because of their similar design, without an automatic brewing unit.

	Total devices	Successfully repaired devices	Spare parts necessary		Cleaning/decalcification necessary		Average time required
			Number	Average cost of materials [Fr.]	Number	Average cost of materials [Fr.]	Hours [h]
Total	45	39	17	26.9	27	5.9	0.9
Fully automatic machines	16	15	9	29.7	10	6.0	1.0
Capsule machines*	29	24	8	23.8	17	5.9	0.8

* incl. portafilter

Table 2: Results of repair of coffee makers

Repair success

Of the 45 machines, 39 could be fully repaired again (Table 2), thereof 15 fully automatic machines and 24 capsule machines. This corresponds to almost 90% of all the machines.

Time required for repair

The capsule machines were found to be not very easy to maintain and repair. This is also reflected in the fact that the average repair time is not very different from that of the fully automatic machines, even though the latter are much more complicated (fully automatic, mechanical brewing unit with motor drive, grinder, etc.). The housings of the capsule machines are almost always clipped and are therefore difficult to open non-destructively. The fully automatic machines, on the other hand, are mostly screwed together and are therefore easier to open.

Cleaning/decalcification was necessary in very many cases for both types.

Spare parts

While spare parts were needed in 60% of the cases for the fully automatic machines, this was only necessary in just under a third of the cases for the capsule machines.

The average material costs for the repair of the two machine types are in a similar range, as the parts are similar (pumps, solenoid valves, etc.). The spare parts as well as any special tools were basically available in online shops.

However, if one compares the costs of spare parts in Switzerland and in neighbouring countries, there are sometimes very large differences. Many spare parts are much more expensive in Switzerland than in other countries. In addition, certain spare parts, especially for capsule machines, are not available in Switzerland, even though, according to the declaration on the packaging, some of them are manufactured in Switzerland.

Spare part	Type	Price Switzerland	Price Germany
Coffee spout	Krups XN250*/Turmix TX180 U /Nespresso U	CHF 14.40*	€ 1.89*
Pressure regulator Nespresso	Pixie, various brands	CHF 22.50*	€ 4.90*
Printed circuit board	Krups XN250*/Turmix TX180 U /Nespresso U	Not available	€ 25.17**
Pressure relief valve	Krups/Nespresso/Delonghi Citiz	Not available	€ 5.90*

* incl. VAT, excl. shipping

** excl. VAT, excl. shipping

Table 3: Price examples for spare parts Switzerland - Germany (as of May 2022)

Maintenance errors of customers

21 of the 45 coffee machines showed a defect that was most likely caused by maintenance or operating errors on the part of the customers. In most cases, the cleaning and descaling of the machines was insufficient. This means that about 50% of the repairs could have been avoided by the users.

Design flaws of manufacturers

In just under 20% of the machines, a maintenance-friendly design would have meant that no defect would have occurred at all. This applies in particular to the outlet parts through which coffee flows. Since the fats contained in the coffee can build up in the outlet parts and cause blockages, these parts should be easy to remove and clean. With capsule machines, these parts usually cannot be easily removed because they are almost an integral part of the machine.

4. Discussion of the results

If the repair times are calculated with an hourly rate of Fr. 100 and compared with an estimated market value of approximately a quarter of the new price, it can be seen that the repair costs of a capsule machine exceed the current value of the machine by a factor of 2-3 times (Table 4). These machines can therefore not be commercially repaired in Switzerland. In the case of fully automatic machines, the repair costs are about half the current value of the machines. A repair can therefore be carried out by a commercial repair shop in Switzerland:

	Avg. New price [Fr.]	Average market value [Fr.]	Repair costs [Fr.]
Fully automatic machines	900	225	124
Capsule machines*	120	30	87

Table 4: Repair costs compared to market value

Cheaper appliances, i.e. capsule machines in particular, are usually not screwed together and are therefore more difficult to repair. The tools needed to repair coffee machines are readily available. The same applies in principle to spare parts, with the restriction that these are sometimes available at much lower costs in nearby countries. A more maintenance-friendly design, such as easy removing for cleaning of coffee carrying parts, could avoid some of the repairs, especially for capsule machines. Screwed capsule machines instead of using clips would reduce repair costs, but the repair costs would still be higher than the current market value of the machine.

5. Recommendations

The following recommendations can be derived from the repairs carried out as well as from the procurement of spare parts - despite the narrow data basis.

- **Maintenance:** Better maintenance of the machines could significantly reduce the frequency of repairs. On the one hand, this is addressed to the users, who should be encouraged to decalcify and clean their coffee machines regularly (also capsule machines) in order to remove the layers of fats that build up and thus ensure an undisturbed flow. On the other hand, the manufacturers also have a duty. This is because capsule machines in particular are not built to be maintenance-friendly. The parts most prone to clogging are usually not accessible to the user for cleaning. This applies above all to the coffee spout parts of the machine. In most cases, this point is not even mentioned in the operating instructions for capsule machines.

==> Consumers must be encouraged to maintain the machines correctly.

- **Construction:**
 - Most capsule machines are not designed to be easy to repair. Since the housing is often held together with clips, it is difficult to open the housing without destroying it. It is not possible to see from the outside where the retaining cams are. Fortunately, there are YouTube videos that show how to open the housing of such machines.
 - Also, parts that should be cleaned regularly (see maintenance) are only accessible when the machine is disassembled.

- In this respect, fully automatic coffee machines are much easier to repair and are usually screwed together, albeit often with special screws. However, the appropriate tools (bits) are readily available in Switzerland.

==> Manufacturers should be obliged to design appliances in such a way that they can be opened without the need for special tools and that parts requiring cleaning are easily accessible.

- Spare parts: For capsule machines, usually only "external" spare parts such as the water tank, drip tray, etc. are available in Switzerland. Parts that affect the "inner life" of the machine are practically not available in Switzerland. The manufacturer cites safety concerns as the reason for this. However, parts such as pumps or solenoid valves, etc., which are also used in fully automatic machines, are available in Switzerland. In contrast, practically all parts for capsule machines are available in neighbouring countries. For fully automatic coffee machines, virtually all spare parts are available in Switzerland.

==> Manufacturers/Dealers should be obliged to provide spare parts for the machines they manufacture or distribute at fair prices.

- Instructions:

- Operating instructions: The lack of maintenance of coffee machines is at least partly due to the fact that the operating instructions are inadequate. Especially in the case of capsule machines, only descaling is usually described; instructions for removing coffee fats and residues are usually missing.

==> Manufacturers/Dealers should be required to describe the correct maintenance, including cleaning of the coffee-carrying parts of the machines, in the operating instructions. It would also be best to have a separate cleaning program for capsule machines, as is the case with fully automatic machines.

- Repair instructions: Instructions for repairing coffee machines can sometimes be found on the internet. There are detailed instructions (e.g. komtra.de) for opening the housing and removing/replacing/repairing components such as the brewing unit, grinder, pumps, thermoblock, outlet valve, etc., especially for fully automatic coffee machines. Repair instructions for the most common capsule machines (e.g. Pixie type), which are offered by various manufacturers (Nespresso, DeLonghi, Krups, Turmix, Siemens, etc.), can also be found on the Internet, although they are not so easy to find.

==> Manufacturers/dealers are encouraged to provide repair instructions that will enable an interested repairer to replace the parts that most frequently have to be repaired.

6. Concluding remarks

It turns out that a detailed repair study provides a lot of information for device categories that are of interest. In comparison the evaluation of existing repair databases is much more difficult, especially because the data collection is not standardised. However from the existing databases, it is very easy to see which appliances are most frequently brought in for repair. The Repair Monitor provides a very good overview. It shows that even in a worldwide perspective, similar devices are always on the top of the "Top Ten" list of devices brought in for repair.

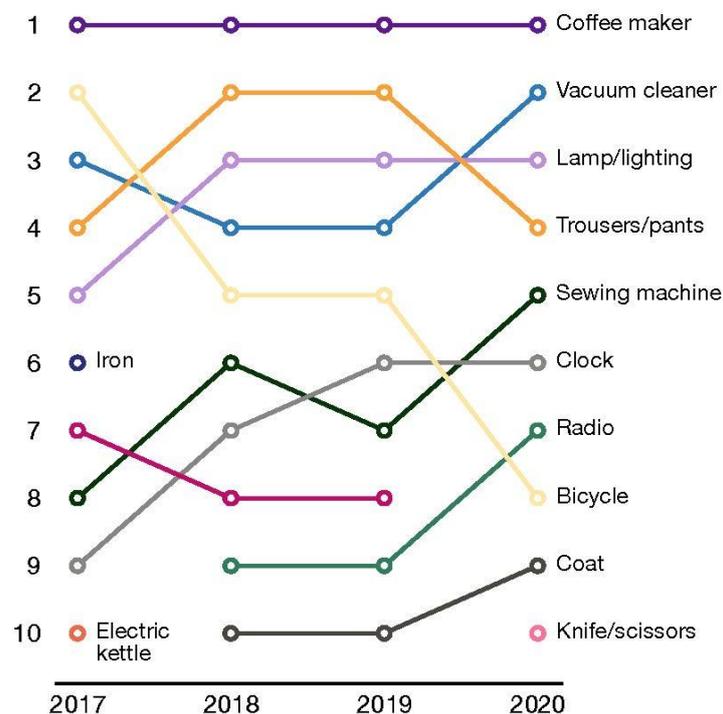


Figure 1: Top Ten List of Most Brought to Repair Cafés (from Repair Monitor Factsheet 2020)