SUPPORTING INFORMATION FOR:

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Supporting repairability analysis through graph-based visualisation

Summary

This supporting information provides additional details on the results, incorporating tables and figures that complement and enhance the information presented in the main study.

Table S1. *Nodes input data for a capsule coffee machine.*

Id	Label	Weight	Diagnostic support and interfaces	Spare parts availability	Spare parts interface	Spare parts availability duration	Spare parts cost
0	Capsule coffee machine	100	0	7.5	-	0	0
1	Water Tank	9.6	0	10	-	0	6.6
2	Tank Intake Trim	0	-	-	-	-	-
3	Inner Right Casing	0	-	-	-	-	-
4	Inner Left Casing	0	-	-	-	-	-
5	Tray Cluster	0	-	-	-	-	-
6	Conditioning System Comp.	0	-	-	-	-	-
7	Boiler	6.4	0	7.5	-	0	0
8	Lever	-	-	-	-	-	-
9	Right Shaft	-	-	-	-	-	-
10	Left Shaft	-	-	-	-	-	-
11	Right Casing	-	-	-	-	-	-
12	Left Casing	-	-	-	-	-	-
13	Clamp	-	-	-	-	-	-
14	Power Cable	-	-	-	-	-	-
15	Rear Casing Cluster + Switch	-	-	-	-	-	-
16	Button Panel	-	-	-	-	-	-
17	Rear Casing	-	-	-	-	-	-
18	Switch	9	0	7.5	-	0	0
19	Coffee Conditioning	11.9	0	7.5	-	0	0
20	Boiler + PCB Cluster	-	-	-	-	-	-
21	PCB	5.7	0	7.5	-	0	0
22	Capacitor	6.6	0	7.5	-	0	0
23	Sensors	-	-	-	-	-	-
24	Boiler-Pump Hose	-	-	-	-	-	-
25	Pump-Tank Hose	15.5	0	7.5	-	0	0
26	Filter	10.8	0	7.5	-	0	0
27	Water Pump	15.8	0	7.5	-	0	0
28	Pump Protector	-	-	-	-	-	-
29	Pump Positioner	-	-	-	-	-	-
30	injector	-	-	-	-	-	-
31	O-ring	8.7	0	7.5	-	0	0

Table S2. *Edges input data for a capsule coffee machine.*

Source	Target	Type	Weight	Physical	sequentiality	Disassembly sequence eDIM (s)	Fastener	Nº Fasteners	Fastener score	Tools	Tools score	Working environment	Working environment Skill level	Skill level score
1	2	Undirected	0.47	Yes	No	0	0.47	Lug	4	10	Hand	10	Home	10	-	-
1	3	Undirected	0.47	Yes	No	0	0.47	Lug	1	10	Hand	10	Home	10	-	-
1	4	Undirected	0.47	Yes	No	0	0.47	Lug	1	10	Hand	10	Home	10	-	-
0	1	Directed	0	No	Yes	1	0	-	-	-	-	-	-	-	Apprentice	10
5	4	Undirected	1.4	Yes	No	0	1.4	Loose fit	1	10	Hand	10	Home	10	-	-
1	5	Directed	0	No	Yes	1	0	-	-	-	-	-	-	-	-	-
6	4	Undirected	4.7	Yes	No	0	4.7	Lug	2	10	Hand	10	Home	10	-	-
6	4	Undirected	4.7	Yes	No	0	4.7	Cantilever Snap	1	10	Spudger	7,5	Home	10	-	-
6	7	Undirected	3.27	Yes	No	0	3.27	Loose fit	1	10	Hand	10	Home	10	Professional	0.71
5	6	Directed	0.47	No	Yes	1	0.47									
8	9	Undirected	4.6	Yes	No	0	4.6	Screw	1	10	Screwdriver	10	Home	10	-	-
8	10	Undirected	4.6	Yes	No	0	4.6	Screw	1	10	Screwdriver	10	Home	10	-	-
6	8	Directed	0	No	Yes	1	0	-	-	-	-	-	-	-	-	-
12	4	Undirected	19.37	Yes	No	0	19.37	Cantilever Snap	7	10	Spudger	7,5	Home	10	-	-
12	4	Undirected	0.47	Yes	No	0	0.47	Lug	11	10	Hand	10	Home	10	-	-
8	12	Directed	0.477	No	Yes	1	0.477	-	-	-	-	-	-	-	-	-
12	11	Directed	6.87	Yes	Yes	1	6.87	Cantilever Snap	2	10	Spudger	7,5	Home	10	-	-
11	3	Undirected	24.37	Yes	No	0	24.37	Cantilever Snap	9	10	Spudger	7,5	Home	10	-	-
11	3	Undirected	0.48	Yes	No	0	0.48	Lug	10	10	Hand	10	Home	10	-	-
13	3	Undirected	0.87	Yes	No	0	0.87	Cantilever Snap	1	10	Hand	10	Home	10	-	-
11	13	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
14	21	Undirected	6.87	Yes	No	0	6.87	Faston cable	2	10	Tweezers	7,5	Home	10	Manufacturer	0.5
14	7	Undirected	4.37	Yes	No	0	4.37	Faston cable	1	10	Tweezers	7,5	Home	10	Professional	0.71
13	14	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
2	3	Directed	6.87	Yes	Yes	1	6.87	Cantilever Snap	2	10	Spudger	7,5	Home	10	-	-
2	4	Undirected	6.87	Yes	No	0	6.87	Cantilever Snap	2	10	Spudger	7,5	Home	10	-	-
14	2	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
3	4	Directed	16.87	Yes	Yes	1	16.87	Cantilever Snap	6	10	Spudger	7,5	Home	10	-	-
3	4	Directed	0.47	Yes	Yes	1	0.47	Guide	3	10	Hand	10	Home	10	-	-
3	4	Directed	0.47	Yes	Yes	1	0.47	Lug	2	10	Hand	10	Home	10	-	-
3	17	Undirected	0.47	Yes	No	0	0.47	Lug	2	10	Hand	10	Home	10	-	-
17	4	Undirected	0.47	Yes	No	0	0.47	Lug	2	10	Hand	10	Home	10	-	-
3	4	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
15	21	Undirected	0.47	Yes	No	0	0.47	Press fit	1	10	Hand	10	Home	10	Manufacturer	0.5
4	15	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
16	17	Undirected	2.07	Yes	No	0	2.07	Cantilever Snap	4	10	Hand	10	Home	10	-	-
15	16	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
18	17	Undirected	4.37	Yes	No	0	4.37	Cantilever Snap	1	10	Spudger	7,5	Home	10	-	-
18	17	Undirected	4.37	Yes	No	0	4.37	IDC	1	10	Tweezers	7,5	Home	10	-	-
18	17	Undirected	0.47	Yes	No	0	0.47	Guide	2	10	hand	10	Home	10	-	-
16	18	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	Professional	5
26	25	Undirected	0.47	Yes	No	0	0.47	Press fit	1	10	Hand	10	Home	10	Professional	2.5
3	26	Undirected	0.47	Yes	No	0	0.47	Guide	1	10	Hand	10	Home	10	Professional	2.5
4	26	Directed	0.47	Yes	Yes	1	0.47	Cantilever Snap	1	10	Hand	10	Home	10	Professional	2.5
4	26	Directed	0.47	Yes	Yes	1	0.47	Guide	1	10	Hand	10	Home	10	Professional	2.5
28	27	Undirected	6.87	Yes	No	0	6.87	Cantilever Snap	2	10	Spudger	7,5	Home	10	Professional	1.67
4	28	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
9	7	Undirected	0.87	Yes	No	0	0.87	Press fit	1	10	Hand	10	Home	10	Professional	0.71
9	19	Undirected	0.47	Yes	No	0	0.47	Loose fit	1	10	Hand	10	Home	10	Manufacturer	0.83
15	9	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
10	7	Undirected	0.47	Yes	No	0	0.47	Press fit	1	10	Hand	10	Home	10	Professional	0.71
10	19	Directed	0.47	Yes	Yes	1	0.47	Loose fit	1	10	Hand	10	Home	10	Manufacturer	0.83
9	10	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
29	27	Directed	0.47	Yes	Yes	1	0.47	Loose fit	1	10	Hand	10	Home	10	Professional	1.67
4	29	Undirected	0.47	Yes	No	0	0.47	Guide	2	10	Hand	10	Home	10	-	-
28	29	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
4	25	Directed	0.47	Yes	Yes	1	0.47	Guide	2	10	Hand	10	Home	10	Professional	2.5
27	24	Undirected	4.37	Yes	No	0	4.37	Clamp	1	10	Tweezers	7,5	Home	10	-	-
27	21	Undirected	6.87	Yes	No	0	6.87	Faston cable	2	10	Tweezers	7,5	Home	10	Manufacturer	0.5
25	27	Undirected	0.87	Yes	No	0	0.87	Press fit	1	10	Hand	10	Home	10	Professional	1.67
20	19	Undirected	0.47	Yes	No	0	0.47	Loose fit	1	10	Hand	10	Home	10	Manufacturer	0.83
10	20	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
21	7	Undirected	6.87	Yes	No	0	6.87	Faston cable	2	10	Tweezers	7,5	Home	10	Professional	0.71
21	23	Undirected	4.37	Yes	No	0	4.37	IDC	1	10	Tweezers	7,5	Home	10	-	-
18	21	Undirected	4.37	Yes	No	0	4.37	IDC	1	10	Tweezers	7,5	Home	10	Manufacturer	0.5
20	21	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	Manufacturer	0.5
21	22	Directed	63.27	Yes	Yes	1	63.27	Solder	1	0	Solder gun	7,5	Home	10	Manufacturer	2.5
30	7	Directed	9.37	Yes	Yes	1	9.37	Cantilever Snap	3	10	Spudger	7,5	Home	10	Professional	0.71
20	30	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
30	31	Directed	3.27	Yes	Yes	1	3.27	Loose fit	1	10	Tweezers	7,5	Home	10	Professional	5
20	24	Undirected	0.47	No	No	0	0.47	-	-	-	-	-	-	-	-	-
20	23	Directed	0.47	No	Yes	1	0.47	-	-	-	-	-	-	-	-	-
7	24	Undirected	4.37	Yes	No	0	4.37	Clamp	1	10	Tweezers	7,5	Home	10	-	-
7	23	Undirected	4.37	Yes	No	0	4.37	Faston cable	1	10	Tweezers	7,5	Home	10	-	-
23	7	Undirected	4.37	Yes	No	0	4.37	Screw	1	10	Screwdriver	7,5	Home	10	Professional	0.71

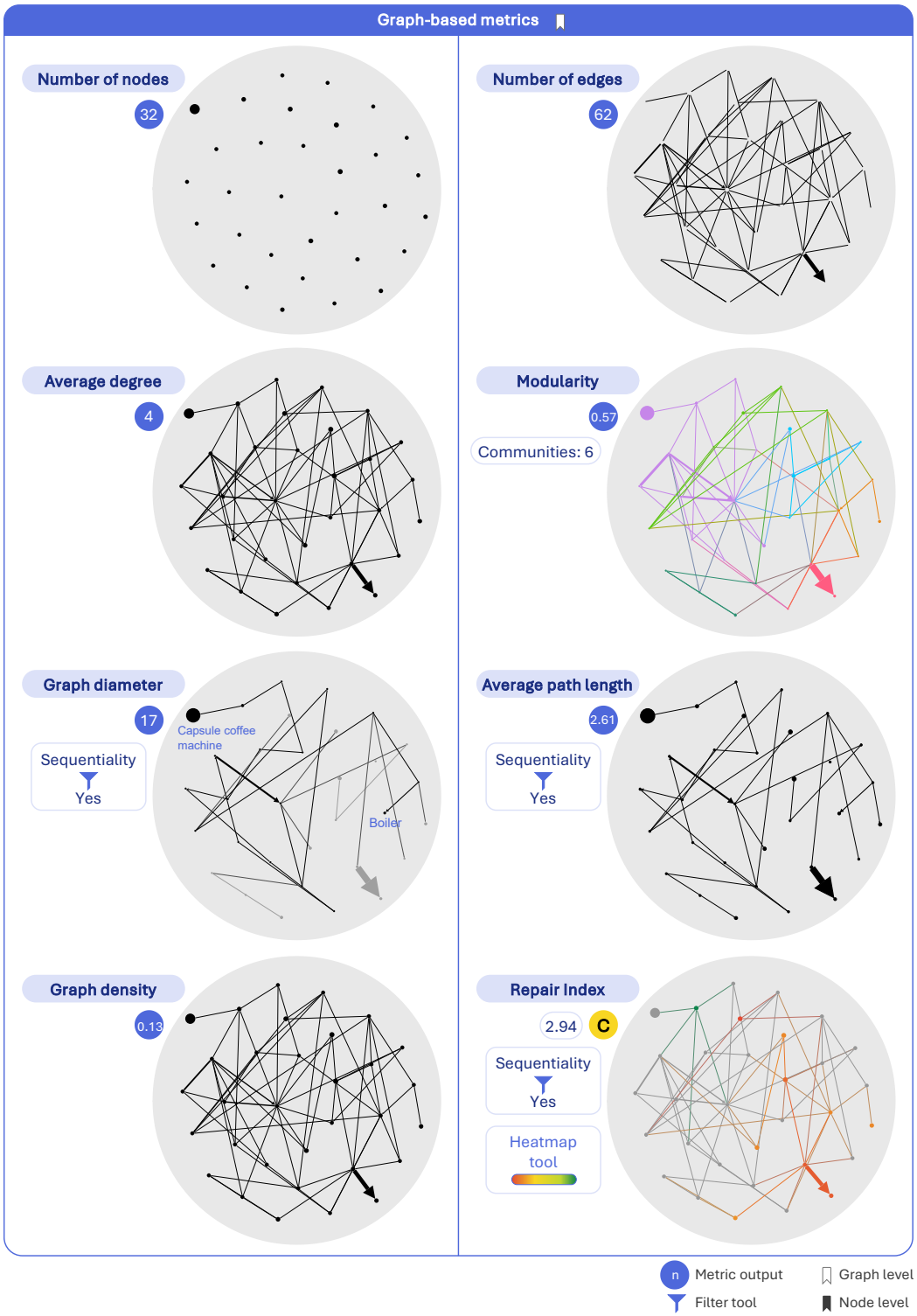

Figure S1. *Graph-based repairability assessment of capsule coffee machines: graph-level metrics*

Table S3. *Product-level parameters used in RI calculation.*

	Information type	Information availability	Return options	Data management	Restart type
Graph	-	3.3	-	-	-

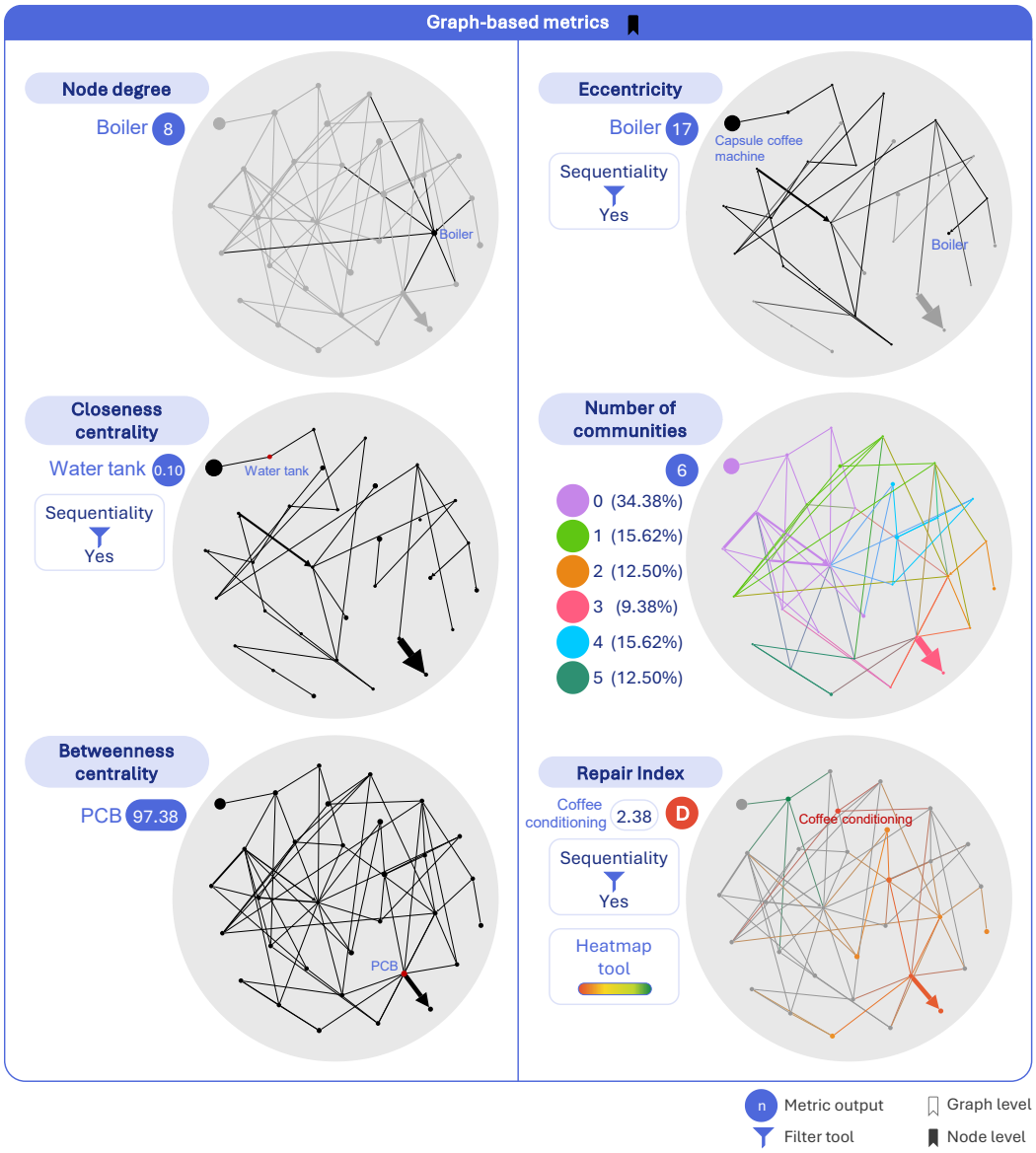

Figure S2. *Graph-based repairability assessment of capsule coffee machines: node-level metrics*