



What might
a more

Sustainable

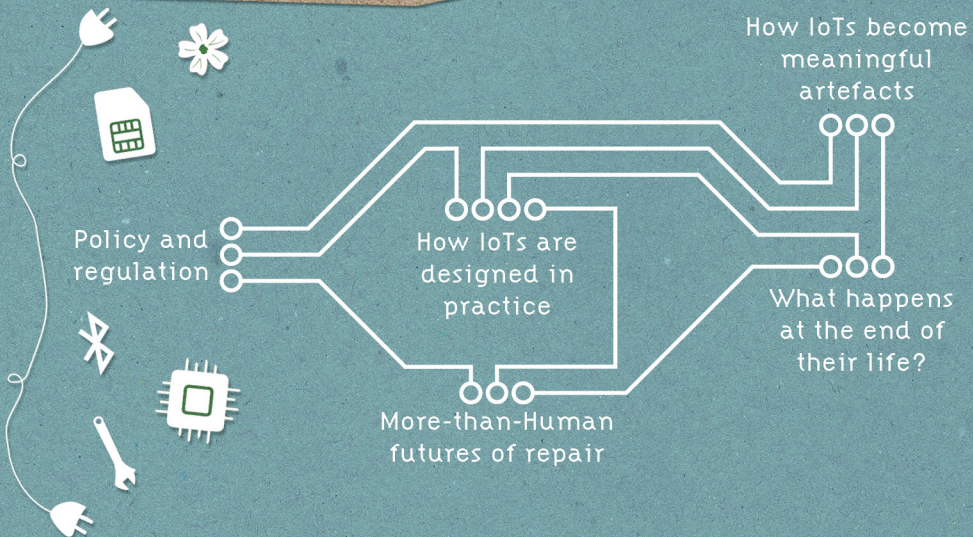
Internet of
Things
look like?



Created by the
Fixing the Future Collective

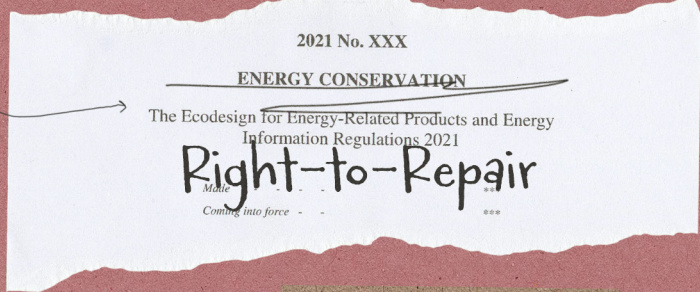
What might a more sustainable Internet of Things look like?

The redundancy and lack of repairability of IoT devices has led them to become major contributors to the electronic waste crisis.



This Zine was produced by the members of the **Fixing the Future** collective: Christopher Boniface, Teresa Castle-Green, Paul Coulton, Dimitrios Darzentas, Nidhi Dubey, Susan Lechelt, Joseph Lindley, Violet Owen, Namrata Primlani, Neelima Sailaja, Michael Stead, Melissa Terras and Lachlan Urquhart.

EU and UK Laws are targeting different stages of the IoT lifecycle to improve sustainability.



hardware
software
data

"How fixable is this? You're going to get judged!"



IoT
design/before sale

EUROPEAN COMMISSION
EU RIGHT TO REPAIR
How can IoT manufacturers support access to spare parts and repair services?
Proposal for a Directive of the European Parliament and Council
on common rules promoting the repair of goods and amending Regulation (EU) 2017/2394, Directives (EU) 2019/771 and (EU) 2020/1828

EN EU EcoDesign Law: Regulation (EU) 2023/1670
How can IoT have more resilient components and screens?

"make sure there is better access to spare parts"

"Easier to dismantle, easier to recycle"

"Harder to break, easier to replace, parts galore"

European Commission
Energy, Climate change, Environment
Waste from Electrical and Electronic Equipment (WEEE)
How to ensure IoT eWaste does not go to landfill?



"stop selling insecure devices, make them and keep them secure"

European Parliament
2019-2024
Cyber Resilience Act
How can IoT be kept secure across its lifespan?

How IoTs are designed in practice

I need a keyring to give out at a trade show. I need it small and blue, with our logo on and IoT connected.

Why connected? Is she serious?

Let's iterate now and get it perfect before we put it out there.

This is a low value item so costs need to be kept to a minimum.

If we glue parts together we can save loads!!!!

Mr. Manager

Data Dude

Hard Ware

My software is awesome

People like connected things!

KEYRING

The Design Brief

The Hardware Engineers

Let's just get the basics in place and we can modify the interface and functionality after launch.

Let's do some development sprints. We need to do a mobile app right?

KEYRING

The Software Engineers

Right, so what data could we collect and how can we make it kind of useful?

It needs to be reliable and secure. What contexts will it be used in?

KEYRING

The Data Scientists

Let's get these design teams together to ensure a cohesive user experience throughout the whole customer journey.

Okay.

This keyring is so over engineered!

KEYRING

The Service and Experience Designers

Oh it's broken, is this product repairable?

Well, yeah, um we kind of thought about it...

It wasn't in the design brief right?

Nope.

But what about reparability...

Designing for Repair

When designing for repair as a use case, particular attention should be paid to:

REPAIRERS
DATA
PRIVACY
REPAIR

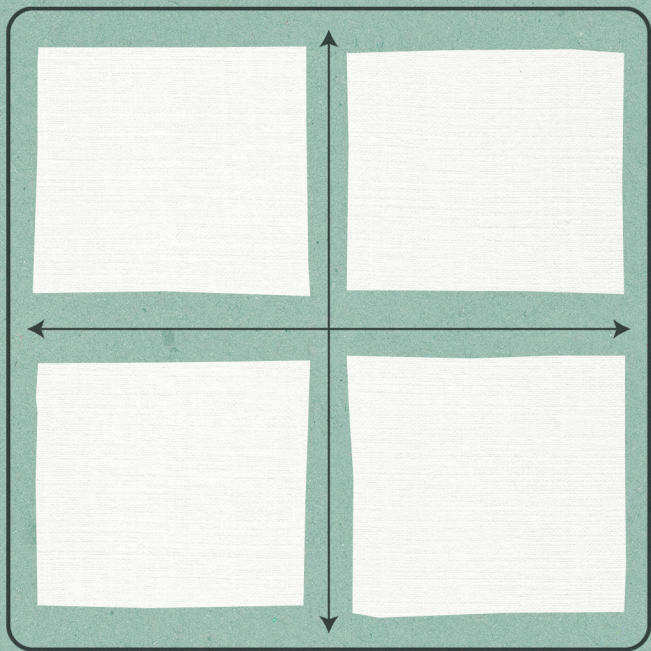
CONTEXT
SUPPORT
DIAGNOSIS
MODULAR

Z	E	S	U	P	P	O	R	T	A
F	M	C	X	H	I	B	E	D	T
C	P	O	K	U	L	T	P	I	S
U	R	N	D	A	T	A	A	A	Y
R	I	T	E	U	N	S	I	G	L
I	V	E	M	O	L	R	P	N	I
A	A	X	S	Y	I	A	E	O	G
P	C	T	A	R	Y	O	R	S	X
E	Y	F	M	D	A	V	S	I	L
R	E	T	N	I	I	T	L	S	M

Functional device, to meaningful artefact

Design dictates devotion,
 Aesthetics alter attitudes,
 Shoddy style, swift scrap,
 Beauty begets bonding,
 Tacky tech, throwaway toy,
 Sleek and serviceable, sustained and saved,
 Alluring and accessible, admired and attended,
 Form and function forge the future.

Perceived as repairable



Repairable Aesthetics

Non-Repairable Aesthetics

Perceived as not worth repairing.

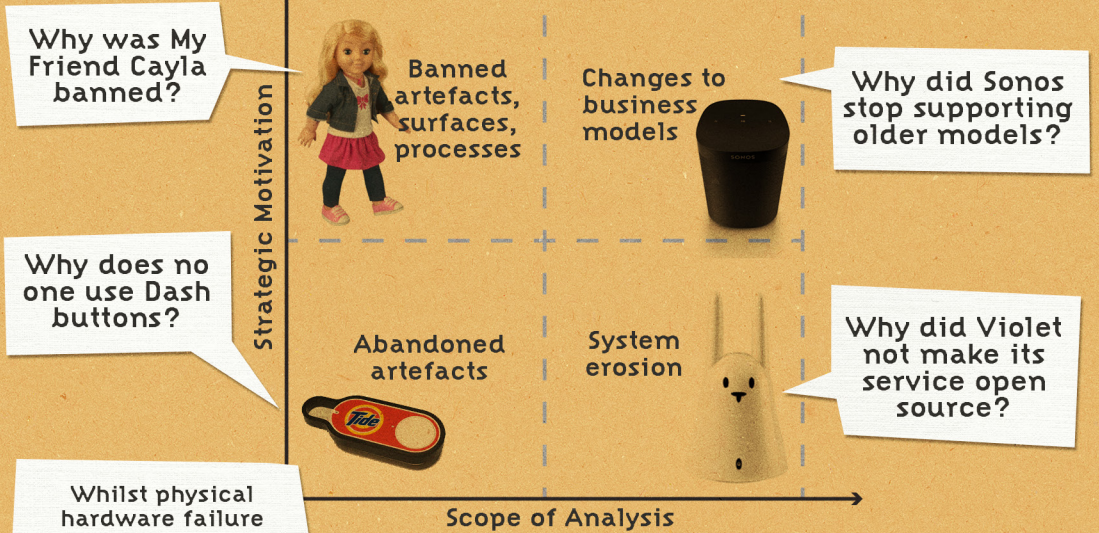
Write the words above - decide where they fit

- “Utilitarian” “Functional” “Industrial” “Clinical” “Practical” “Replaceable”
- “Get while it lasts” “One-use” “Disposable” “Cheap” “Rubbish” “Waste”
- “Modular” “Fixable” “Customised” “Keepsake” “Buy for life” “Mine”
- “Beautiful” “Seamless” “Expensive” “Warranty” “Closed” “Waste”

cut me out and place me on the chart where I belong



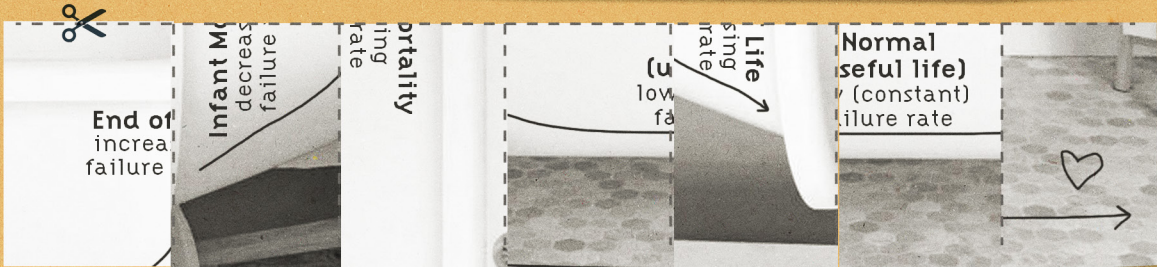
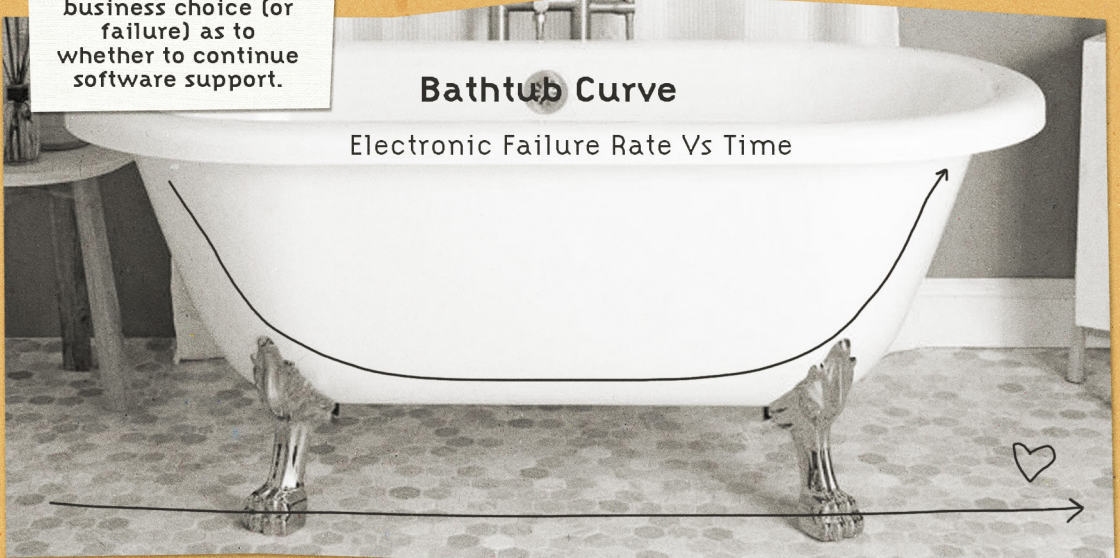
What are the drivers that will stop or discourage use of a particular product or service?



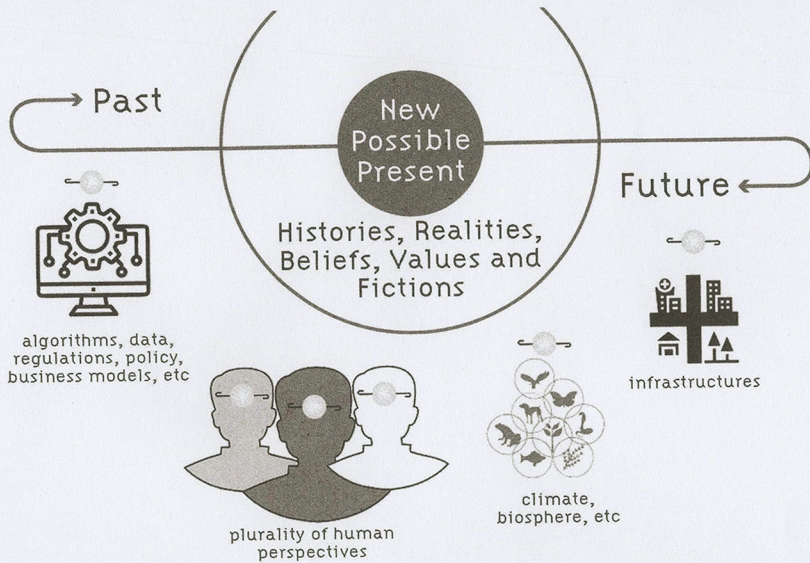
Whilst physical hardware failure was largely driven by its electronics it is now driven by the business choice (or failure) as to whether to continue software support.

Bathtub Curve

Electronic Failure Rate Vs Time



More-than Human Futures of Repair



The things in the Internet of Things are not simply the physical products but include algorithms, business models, regulations, resources etc to form a network of human and non-human things.

“we do not understand the things we create go on designing after we designed them”

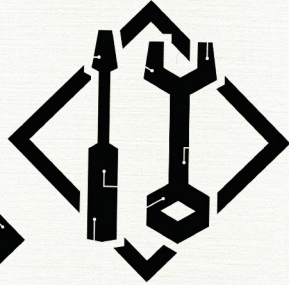
the mess left behind when it doesn't

the myth that tech will save us

see

saw

Fixing the Future →



‘Fixing the Future: The Right to Repair and Equal-IoT’ is a 2-year, £1.25 million research project funded by the UK Engineering and Physical Sciences Research Council (EPSRC) investigating how the lack of repairability in the consumer Internet of Things (IoT) will adversely impact equity, inclusion, and sustainability in the digital economy.

Lancaster
University 

Edinburgh Napier
UNIVERSITY 



THE UNIVERSITY
of EDINBURGH



Engineering and
Physical Sciences
Research Council



University of
Nottingham
UK | CHINA | MALAYSIA

<https://ftf.wp.horizon.ac.uk/>

