Beyond Ownership

Business models for sustainable, smart appliances

INTERACT

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Executive Summary

Manufacturers are being urged to invest in digital technology and to manage their environmental impact. Yet customers often reject new technology and more sustainable products in favour of cheaper and less energy efficient options.

Our research looked at business model innovation and digital technology adoption in washing machines, and highlights the need to focus on customer experiences and outcomes, rather than features.

Based on the research, the key recommendations are:

Focus on outcomes and experience not features

Digital technology can improve energy efficiency and maintenance but customers may not value connectivity and digital features in their own right or may even be sceptical about innovations involving data sharing. Manufacturers could focus on the outcomes and experiences their technologies can offer to customers such as peace of mind.

Focus on transparency of cost and value

Customers may be reluctant to pay more for new technologies without appreciating the value on offer. While business models can spread the cost over a longer time period, customers are sceptical of ubiquitous subscription models. Business model innovation should focus on highlighting the value that digital technology can bring to customers and offer transparency over the costs and benefits.

Focus on building trust through technology

Customers see innovation as risk when they consider new technologies and new business models for domestic appliances. Instead manufacturers could focus on building trust by offering and delivering guarantees of value.

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What is the problem?

In the face of intense global competition, tightening environmental regulations and fear of obsolescence, manufacturers invest in cutting edge technological features. Policy makers argue the need for faster adoption of Industrial Digital Technology[1] in part to support sustainability. Meanwhile customers seem resistant to technological features and continue to seek low cost, often less sustainable goods.

To help address the problem, the project aimed to understand what factors might drive consumer adoption of digitally enabled products and services. It focused on domestic washing machines as an almost ubiquitous[2] product that may be ripe for innovation.

Why does it matter?

Digital technologies, and the energy and resource efficiency they promise, are crucial to sustainable development efforts and achieving net zero[3].

Such technologies can be an important part of a sustainable and circular economy by supporting resource and energy efficiency in the use and end-of-life recovery of manufactured products.

For example, washing machines are often used inefficiently, wasting energy and water; and they are regularly replaced with new models before the end of their effective lifetime, due to the lack of incentive to repair them. As a result, many usable washing machines find their way to landfill rather than being refurbished to extend their lifecycle. Digital technologies can help to monitor product condition to facilitate efficient use, enable timely repair and to make recovery easier.

To enable these benefits, however, requires a change in consumer attitudes that manufacturers can facilitate through effective innovation.

What did we do?

We engaged with a range of relevant stakeholders to understand technology and sustainability in the context of domestic appliance manufacturing.

Through a rigorous research programme we examined customer perceptions of business models and technologies in this context.

[1] Made Smarter (2017). Made smarter review. UK Industrial Digitalisation Review. Available at: https://www.madesmarter.uk/about/the-made-smarter-review/

[2] BEIS (Department for Business, Energy & Industrial Strategy). 2021. Lights, appliances, and smart technologies Final report. Available at https://assets publishing.service.gov.uk/media/61449c3cd3bf7f05b2ac20a4/efus-light-appliances-smart-tech.pdf

[3] BEIS (Department for Business, Energy and Industrial Strategy). 2021a. Digitalising our energy system for net zero, strategy and action plan. https://www.gov.uk/government/publications/digitalising-our-energy-system-for-net-zero-strategy-and-action-plan

1. Contextualisation

Through a literature review, industry conference and expert interviews we found:

Technical research and policy focus on energy systems and sustainability but may not align to business models and customer perspective.

Change is difficult as customers have limited appreciation of lifetime costs and energy use, while prevailing business models rely on selling new goods.

2. Exploration

A focus group examined business models, surveys and analysis of online reviews examined customer opinions and found:

Customers do not recognise value in technology and business model innovation, as potential benefits in cost or sustainability are not well communicated.

A lack of trust in products, associated services and service providers makes customers wary of innovation in washing machines.

3. Explanation

A series of experiments tested customer responses to owning or accessing refurbished washing machines, and the effects digital technology might have, we found:

Unfamiliarity creates customer resistance to sustainable business model innovation and circularity.

Digital technology is not attractive in itself but can enhance trust if used to improve customer experience and outcomes.

What did we find?

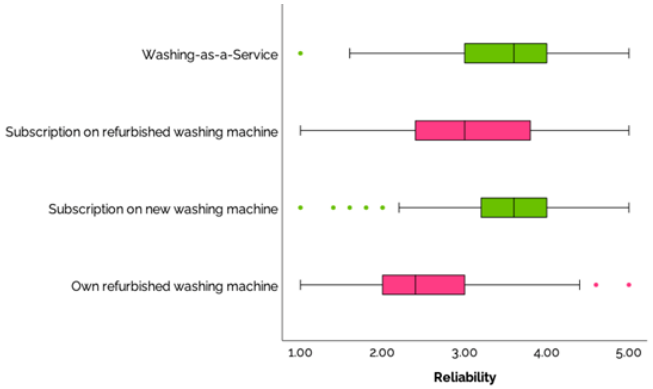
The results revealed several surprising findings that highlight business challenges and opportunities.

1. Do customers prioritise sustainability?

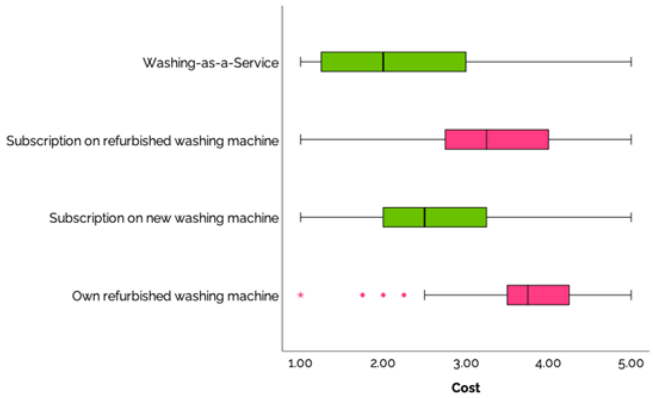
The experiments asked customers to consider replacing their washing machine with a refurbished rather than brand new one. This would offer manufacturers a route to circularity and sustainability. Unfortunately, the results suggest customers find refurbished washing machines unattractive. In particular, they perceive reliability to be lower and cost to be higher, whether buying or leasing.

While manufacturers could use the second-hand market as a route to circularity and sustainability, the benefits may not be evident to customers.

Perceived reliability by business model



Perceived cost by business model

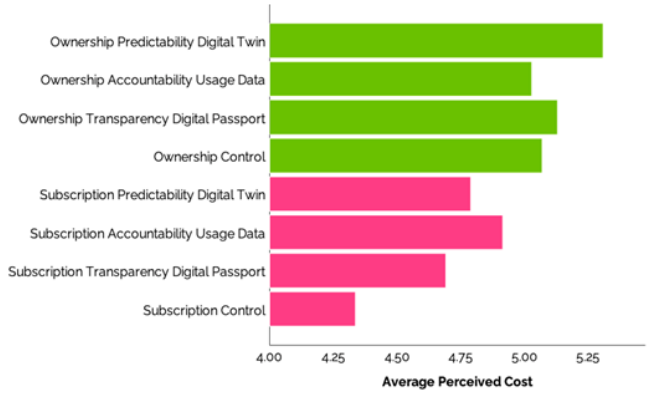


2. Are washing machine customers interested in digital technology?

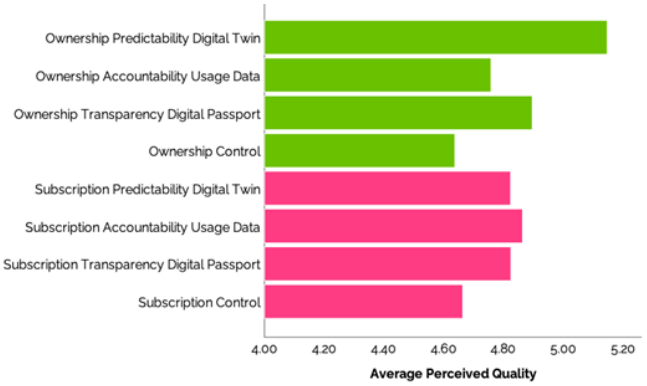
We tested whether digital technologies could help make more sustainable appliances attractive to customers. Technologies including a "digital passport" to document an appliance's history, "smart metrics" to monitor performance and a "digital twin" to monitor the appliance's state of repair. While customers do not appreciate these technologies, they do value the assurance and peace of mind these technologies can enable. Refurbished washing machines were perceived by customers to offer higher quality and better cost when they considered the predictability that a digital twin offers.

In short, emphasising the reliable performance and the resulting experience, rather than the technology used, may appeal more to customers.

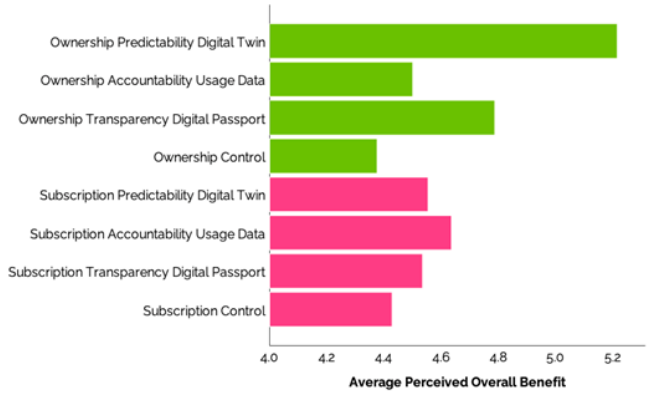
Perceived cost and digital technology



Perceived quality and digital technology



Perceived benefit and digital technology



3. How could manufacturers encourage customers to adopt new business models?

Offering assured maintenance, enabled by digital technology, demands a considerable change to a manufacturer's business model. This is achievable but perceived novelty represents risk so customers need to have trust in the brand offering it.

The results suggest trust is more important for customers considering the subscription model. Customers need to trust a brand to commit to a subscription or even to purchase a refurbished machine, whereas the need for trust is lower when buying a new machine due to warranties and guarantees.

4. Could younger customer segments be more open to new models?

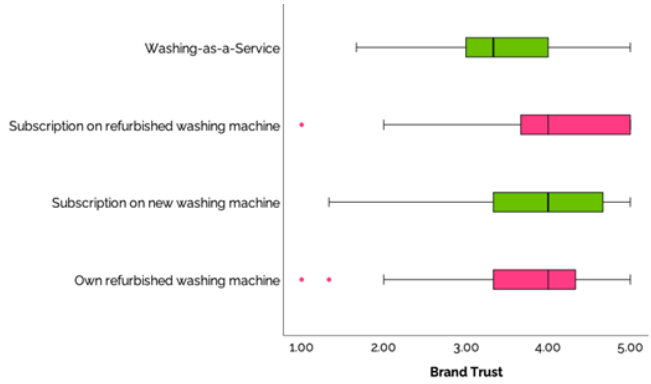
Paying for appliances monthly is perceived to be more expensive and is less desirable, unless manufacturers provide price transparency.

The good news is our results suggest younger customers are more open to subscription models. Compared with the 55+ age groups, who may be more comfortable owning appliances, customers under 25 see cost-effectiveness and social benefits from subscription.

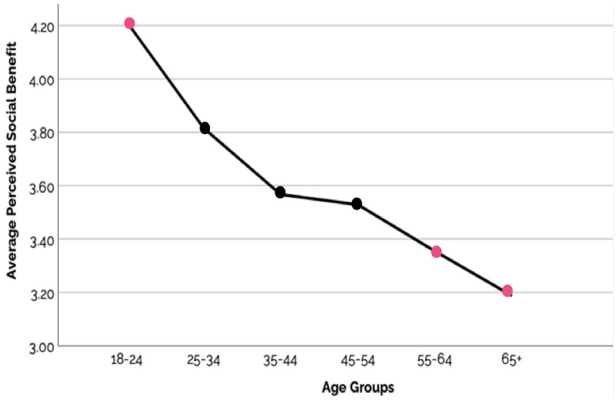
This may be due to the ubiquity of digital platforms and subscriptions in other areas of life and an opportunity to expand such models to other activities and products. On the other hand, the bad news is our surveys showed a growing dissatisfaction with the ubiquitous subscription models. Just as manufacturers may be seeking to embrace servitization to generate recurring revenues, customers may be starting to reject such models as exploitative.

While the opportunities are attractive, the comments below should offer a warning of the threat if customer outcomes and experiences

Perceived trust by business model.

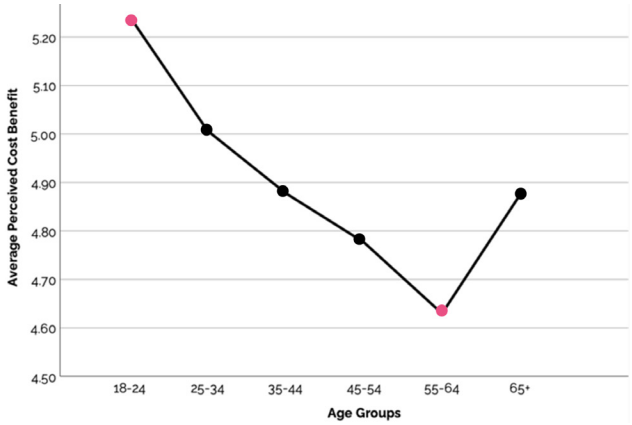


Perceived social benefit by age



Indicates a statistically significant difference between age groups

Perceived cost benefit by age



Indicates a statistically significant difference between age groups

"I'm quite cynical about the lease model, it's an opportunity for companies to make more money while not particularly caring about the customer experience."

"What I really want is a machine that can be repaired by a local independent person when I want, rather than some contract with an anonymous company that will be useless and expensive"

"At what point do we stop offering subscriptions on things? It's built on greed more than anything else."

"I'm not a fan of trends towards subscriptions however and find them exploitative of the consumer."

"I am wary of increasing numbers of subscriptions models in every day consider life and I've started to generally avoid them as a result."

What should you do?

While manufacturers are regularly being advised to adopt more digital technologies, our recommendations lie not in what technology to use but how to apply technology effectively.

The key message is to focus on customer experience and customer outcomes not product features. Digital technology that assures product performance can be attractive. There are signs that domestic appliances and washing machines in particular represent a mature market that is ripe for disruption. If so, simply adding advanced technological features may not be the best strategy, while innovative ways to deliver value can succeed.

Customers do not give much thought to the appliances. Instead they value the peace of mind of guaranteed outcomes (i.e. clean clothes). An added benefit is that this outcome focus creates opportunities for innovation not only in technology but in sustainability and business models.

Circularity is currently limited by customers' unwillingness to use refurbished washing machines, whereas guaranteeing performance and price can be attractive and delivering on the promise opens the possibility to introduce both technology (e.g. condition monitoring) and revenue models (e.g. subscription) as part of an experience-based and outcome-based business model.

To capture the opportunity, manufacturers must ensure they build trust with customers who do not clearly see value in the innovations on offer.

Policymakers promoting digital technologies in the interests of national competitiveness should also consider carefully how the technologies will be applied. Industrial Digital Technology can improve the efficiency and sustainability of manufacturing more of the goods. On the other hand, digital technology can enable a rethink in how these goods deliver outcomes and experiences that enrich customers' lives.

Researchers should benefit from and build on the interdisciplinary nature of this project. Our findings suggest that combining a focus on consumer behaviour, supply chain management and business model innovation with research in engineering and technology can help to unlock the power of technology to tackle sustainability challenges.

The research set out to examine adoption of industrial digital technology in UK manufacturing. Its findings suggest the need to prioritise customer value in digital transformation including harnessing digital technology to deliver peace of mind to customers, building trust and ensuring transparency.

Learn More

Scan or click the QR Code for more information on our research.

Economic and Social Research Council

MADE SMARTER INNOVATION

Acknowledgement

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