Study explores why some tech products provide years of continued use while others are quickly discarded

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Researchers from Radboud University, University of Galway, University of Melbourne, and University of Wisconsin-Madison have published a

new *Journal of Marketing* article that examines common events during the lifecycle of a variety of technology products from adoption to disposal and how companies must consider how they support or limit consumers' "entropy work."

The study is titled "Continued Use Trajectories: How Entropy Work Sustains Technology Assemblages" and is authored by Paolo Franco, Robin Canniford, Marcus Phipps, and Amber M. Epp.

Why do some technology products provide years of continued use while others are dogged by connectivity failures, battery woes, and apps that crash?

The interconnected nature of modern technologies means that continued use depends on a products' capacity to interact with other devices, objects, and infrastructures. Consider gaming consoles that interact with televisions, Bluetooth connections, internet connections, and electricity infrastructures. Their continued use is facilitated or disrupted depending on whether they can establish and maintain these connections.

This new study finds that customers take active roles in extending a technology product's lifecycle and that companies must consider this "entropy work" before limiting or encouraging these activities.

Franco explains that "entropy work includes maintenance and repair activities, such as checking connections, resetting and cleaning devices, applying updates, replacing parts, and consulting others for help. When people cannot perform entropy work, they experience declines in the usefulness and ease-of-use of their devices."

"The increasing prevalence of smart technologies means that these connectivity problems are increasing the amount of entropy work required from users," says Canniford. Moreover, technology companies

often restrict users' abilities to maintain and repair devices and connections. For instance, using third-party parts to replace failing displays or batteries tends to result in annoying notifications or reduced [device](#) functionality for iPhone users.

Continued use trajectories

The study identifies four "continued use trajectories" that chart common events during the lifecycle of a variety of technology products from adoption to disposal.

1. First, some products enjoy a supporting trajectory in which devices work seamlessly with others, automatically connecting and functioning for long periods.

2. Second, a decaying trajectory occurs when a tech product is easy to use in its early years but thereafter sees gradual declines in performance. Batteries drain faster, programs get slower, and connections to other tech products become complex.

   This situation can be caused by the nature of after-sales support: When consumers receive support to perform entropy work early on, but this help recedes in later years, the usefulness of a device will likely decay. For instance, AppleCare is available for two to three years after purchase and, once that warranty ends, customers must consult costly certified technicians or attempt entropy work without support.

3. The third trajectory is a taxing trajectory in which tech products quickly fail to function as expected and consumers need immediate help.

4. Finally, tech products can exist in oscillating trajectories, going

back and forth between functioning properly and running into problems. These situations are frustrating because they force consumers to do unpredictable amounts and kinds of entropy work.

"When users cannot derive the useful benefits of a device, they are more likely to abandon the product, but they also get frustrated with brands. And if a company restricts consumers' ability to receive help from outside sources and funnels them towards their own services, consumers can feel trapped," says Phipps.

To navigate these different trajectories, companies can provide resources such as guides for common recurring problems. Moreover, they can establish or endorse platforms that offer free troubleshooting advice, like Reddit communities and Adobe's own customer service that offer support for its products.

The right to repair

Epp notes that "Given the worsening cost of living crisis, we can understand why consumers increasingly demand the 'right-to-repair' their own devices via access to third party services and parts. Oregon, Colorado, and the European Union have all enacted right-to-repair laws, illustrating a growing movement's momentum to guarantee consumers' ability to perform entropy work and maintain their devices."

Mindful of these movements, companies must consider how they support or limit consumers' entropy work. The study offers several suggestions for chief marketing officers:

- Keep in mind that as the connectivity of a tech product increases, the chances for these connections to enable problems to emerge increases.

- Incentivize customers to upgrade to a new device to improve ease-of-use when entropy work overwhelms them.
- Implement holistic investigations into which technologies, people, and other objects have the capacities to increase the entropy work customers must do to maintain their device's continued use.
- Establish enduring service relationships when tech product issues are likely to recur to help customers maximize periods of stable continued use.

More information: Paolo Franco et al, EXPRESS: Continued Use Trajectories: How Entropy Work Sustains Technology Assemblages, *Journal of Marketing* (2024). DOI: 10.1177/00222429241255306

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