



## The Devil Is in the Details When Assessing Circular Solutions

**Identifying the right blend of circular economy strategies is vital for economic and environmental returns.**

Proving their environmental credentials and embracing sustainable business practices has become a necessity for many organisations. This is, in part, thanks to a shift in consumer attitudes, but also down to a growing understanding that traditional linear business models are increasingly untenable in a world of finite resources.

This change in mindset has led many businesses to consider the benefits of the circular economy. At its heart, circularity aims to reduce or completely eliminate waste from the resource ecosystem, incorporate renewable energy into production processes and utilise product design techniques to maximise the lifespan and value of individual resources.

Various strategies have been put forward to help achieve these aims. These range from adopting leasing and service business models, where a company retains ownership and maintenance responsibilities for the products (and materials) to designing modular products that allow for easier recycling, reuse and refurbishment of individual parts.

### Circularity principles in practice

The **Fairphone** is a good example of a product developed using circularity principles. Now in its

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fourth iteration, this smartphone is made from a mix of recycled, sustainable and fair trade approved materials. It also features a modular product design, which allows customers to easily replace individual parts such as the battery, display or camera once they are worn out, broken or diminished in performance.

As well as offering a more ethical option for consumers, the phone promises environmental and economic benefits by reducing the consumption of resources and using a modular design to extend the life of the phone.

The Ellen MacArthur Foundation, a leading proponent of circularity, believes that the environmental benefits of transitioning to the circular economy would be significant. It estimates a **32 percent reduction** in the consumption of the primary materials used in construction, manufacturing and agriculture; and the European Union's carbon emissions halved by 2030. Meanwhile, a **2015 report** by Accenture predicted that a global circular economy could yield up to US\$4.5 trillion in economic benefits by 2030.

Circular strategies clearly do not have to operate in isolation – Xerox is a successful company that combines a leasing and service business model with modular product design – and many proponents

argue that combining such strategies can actually lead to greater economic and environmental impact.

### What circular strategies to use and when?

**Our research** helps identify when companies should combine a circular design with a circular business model, and when they should be adopted in isolation. Our analysis of an asset company (we will call Asset Z), which looked to apply a leasing business model to its fleet of modular service utility vehicles, found that it was better to just sell these modular vehicles.

Our work suggests that the cost of the individual modular elements that wear out faster needs to be low to ensure economic gains from circular business models. In the service utility vehicle example, the product was separated into two modules: the chassis and the medical box attached on top of the chassis. The chassis wore out faster than the medical box, so needed to be replaced more frequently to extend the life of the vehicle.

Unfortunately for Asset Z, the high price of the chassis module meant that joint execution of leasing and modularity was simply not financially viable. The re-conditioned vehicles, which consisted of a brand-new chassis and the reused medical box, ended up being too expensive to be an appealing proposition to customers when compared to simply leasing a brand-new vehicle.

So, what would happen if we applied those findings to Fairphone? The company already employs modular design principles in its products, so what if it also started to lease its phones rather than simply selling them? Would it work from an economic standpoint, and would it bring greater environmental benefits? The answer, based on the Asset Z case study, is not straightforward. We found that joint execution of leasing and modularity can help improve the profits for a company and provide environmental benefits, but only if a few factors are in place.

In case of the Fairphone 4, it appears that the individual parts are relatively inexpensive for consumers to buy, which suggests they are relatively inexpensive for the company to manufacture. For instance, a replacement camera module costs €80 while the whole phone retails at €579. In this case, combining the modular product architecture with leasing seems to make much more sense for Fairphone, relative to the service utility model of Asset Z.

Companies must also consider whether different modules do depreciate at sufficiently different rates. If all the elements decline at similar rates, then there may be little or no benefit for a customer to lease a

modular product over an integrated product. This was not an issue for the Asset Z case and was actually one of the key factors behind their adoption of this approach.

With the Fairphone, there is perhaps a greater chance that multiple modules might need to be replaced together – if a phone is dropped and needs both a new camera and display, for example. However, the relatively low price for parts should mean it could still be economically viable for consumers to get replacement modules rather than purchasing a brand-new phone.

### Environmental implications for leasing and modularity

However, cheap parts do raise an environmental consideration. By its very nature, modular product design also makes it **much easier to replace** relatively inexpensive individual parts rather than look at ways of extending their life. Knowing that parts will be replaced quickly can diminish the firm's incentives to develop individual modules which are more durable but at the same time more expensive to make. Hence, a joint approach could actually result in greater waste than a customer simply purchasing a product outright.

Our study of Asset Z also concluded that there needs to be a guarantee that the off-lease products are returned in good condition at the end of the lease period. If the medical boxes retrofitted on the new vehicle chassis were not in a state to reuse, then the whole model falls down at the first hurdle. This is only something that can be assured if the firm has a strong (and potentially expensive) maintenance programme in place. This was relatively practical to accommodate with the service vehicle example. The asset company could have reasonable expectations over how the vehicles would be treated by clients and could build in regular maintenance checks as part of the leasing agreement.

However, it is clearly much harder to guarantee a good condition when talking about a portable electronic device such as a smartphone that is treated very differently by different individuals. In fact, the modular nature of the Fairphone might even suggest users are even less careful with the device as they know it is easier to replace that broken display or cracked case. What is more, **studies** have shown that the leasing business model does suffer from moral hazard, that is, customers are more inclined to treat a product that they do not own more roughly. This reality might end up being the biggest stumbling block for Fairphone to incorporate leasing as part of its circularity strategies.

One final point worth mentioning is that **prior research** has already demonstrated that leasing can

drive firms to prematurely discard products in favour of new models. That is, leasing not only makes it easier for the customer to exchange their existing product, but also increases the financial interest of the leasing firm to constantly upgrade the lease agreement. In many ways, this can counteract the original goal of initiatives such as Fairphone, which is to allow users to extend the life of their smartphone for as long as possible.

None of this implies a negative outlook for circular initiatives such as Fairphone or Asset Z. They merely imply that there are many features to circularity and the value propositions arising from combining different circular business models (such as leasing and modularity). Successful examples such as Xerox and Caterpillar show that such joint execution can indeed work very well. What really matters is that a company better understands what circular principles might work best with respect to its product features and customer demands. Overall, not all circular plans offer economic returns in all circumstances. Organisations looking to move to circular solutions must understand this and pay proper attention to the details and potential barriers to implementing these strategies.

***Atalay Atasu*** is the Bianca and James Pitt Chair in Environmental Sustainability, and Professor of Technology and Operations Management at INSEAD.

***Vishal Agrawal*** is the Provost's Distinguished Associate Professor and Lapeyre Family Associate Professor at Georgetown University.

***Sezer Ülkü*** is an Associate Professor and Academic Director of the MBA Global Business Experience at Georgetown University. He was awarded a PhD from INSEAD.

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