

## Circular Economy Policy at a Crossroads: Encouraging Durable Products or Enabling Faster Cycling of Short-lived Products?

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**Abstract:** Non-ownership models, where firms rather than consumers remain product owners, are advocated as a way for firms to prolong product lifetimes and contribute to a more Circular Economy. However, it has been suggested that such models could actually encourage 'faster cycling', meaning earlier product replacement and shorter product lifetimes. Within recent policy discussions, product durability to prolong product lifetimes has become a key focal point. This paper focuses on how policy can encourage product durability and prolonged life for products distributed through non-ownership models. The paper explores the relationship between policy related to product lifetimes and non-ownership models through a review of existing and proposed policy for two product categories: mobile phones and office furniture. The results suggest there is a gap in policy regarding non-ownership models. While existing policies may address some concerns of faster cycling, additional policy propositions from the European Commission should be considered. In particular, while relevant policies related to either studied product group are identified, the policies with most potential come from outside the existing legislative framework on eco-design and resource efficiency measures. Thus, the findings are not only useful for academics and policymakers in the field of Circular Economy and circular business models, but also to practitioners working in firms where these policy frameworks are relevant.

### Introduction

Concerns about the environmental impacts of resource production and consumption have sparked a variety of new policy discussions and legislative proposals within the European Union (Milios, 2018). With the goal of contributing to a more Circular Economy, one focus has been on extending the value of products and resources (European Environment Agency [EEA], 2017). Particular emphasis has been placed on the 'inner loops' of the Circular Economy concept, or how to extend product lifetimes, as keeping existing products in use for longer periods of time can theoretically slow consumption and displace new production (International Resource Panel, 2018).

Within the political discussion, one aspect of achieving extended product lifetimes has focused on designing more durable products. New EU regulations have begun to address durability by providing minimum lifetimes for vacuum cleaners, domestic washing machines, and lighting products (Bundgaard, Mosgaard, & Remmen, 2017). By creating products that are more durable or easily

repairable, consumers may be encouraged to use products longer or even buy second-hand instead of new (Bakker, Hollander, Hinte, & Zijlstra, 2014).

At the same time, the idea of Circular Economy has sparked a resurgence of interest in product-service systems (PSS), specifically PSS non-ownership models that provide 'access over ownership' (Bocken, Pauw, Bakker, & Grinte, 2016; Lacy, Keeble, & McNamara, 2014). In fact, moving towards a 'lease society' has been mentioned within the political debate (Merkies, 2012). In non-ownership models, firms, instead of customers, remain product owners over the product's use.

Non-ownership models could help make the business case for firms to undertake product redesign, create more durable products, and contribute to extending product lifetimes (Tukker, 2004). The argumentation is that these models incentivize firms to create more durable products in order to decrease service costs over product lifetimes and reduce the need for new manufacturing (Stahel, 2001).

However, these models could also encourage earlier product replacement and shorter product lifetimes by making it easier for customers to switch to the newest and latest product models (Wieser, 2016).

This paper will explore existing and proposed EU policy instruments to better understand how they address product durability and longer lifetimes in the context of non-ownership models. We present a review of EU policies related to two different products as a starting point for our investigation. Policymakers, business developers, and academics may use the findings to help facilitate discussions around non-ownership models and product lifetimes.

### **Non-ownership models**

What happens over a product's lifetime during a non-ownership model is not always transparent or clear. Evidence is scarce that firms design such models with a systems approach in mind (Mont, 2002) and product redesign is not always undertaken (Whalen, 2017). There are also no guarantees that the product is actually redistributed again or used for the entirety of its potential product life, as highlighted by recent media and documentaries (Korus, 2019; Huang, 2018).

Although products within the EU that are not used for the entirety of their possible lifetimes may be directed to other uses and purposes (such as exported to other countries for reuse), the exact fate of these products and their final use or disposal is unknown (EEA, 2012; 2014). Moreover, even if such products were collected for recycling, the system would most likely experience significant efficiency loss due to inefficient recycling technology and limited recovery of materials (Andre, Ljunggren Söderman, & Nordelöf, 2019).

A possible lack of accountability can be discerned in such non-ownership model practices, and it is unclear if existing and proposed policies aimed at encouraging product lifetime extension address these concerns. Although numerous policy instruments are being discussed related to extending product lifetimes (Maitre-Ekern & Dalhammar, 2016) and macro-level policy is seen as a way to encourage circular business practices (Whalen & Whalen, in press), it has yet to be seen how existing and proposed policies encourage product lifetime extension

in non-ownership models. In this paper, we aim to develop a better understanding of this by answering the following question: *How do existing and proposed EU policy instruments address durability and longer lifetimes in the context of non-ownership models?*

### **Cases Studies: Mobile Phones & Office Furniture**

As policy measures are often product-focused, we investigate this question by conducting a case study of two specific product categories that have received recent interest from policymakers: mobile phones and office furniture. We first review existing and proposed legislation related to each product category and then reflect on how each would address product life extension (product life extension) in non-ownership models.

#### *Results*

*Existing regulatory frameworks* targeted at product life extension for mobile phones and office furniture are focused on ownership models (see 'Existing policy measures' in Tables 1 and 2). In fact, a variety of frameworks already exist that encourage product life extension on the consumer-side such as minimum guarantees of two years (Svensson et al., 2018) or mandatory availability of supply parts in some countries (EEA, 2016). However, these rules vary from country to country and, even then consumers are often unaware of such measures (European Commission, 2015). Thus, many proposed policy measures aim to increase awareness of consumer rights, such as by labeling (Gåvertsson, Milios, & Dalhammar, 2018).

Other identified *proposed policy measures* can be found under 'General policy recommendations for product life extension' in Tables 1 and 2. These include additional consumer-oriented approaches to protect consumers and encourage product life extension such as guaranteed access to spare parts (Whalen, Milios, & Nussholz et al., 2018; Watson et al., 2017; Sanfelix Forner, Mathieux, & Fulvio, 2014). Green Public Procurement (GPP) is also part of the policy discussion (Öhgren, Milios, Dalhammar & Lindahl, 2019; Forrest, Hilton, Ballinger & Whittaker, 2017). Green Public Procurement (GPP) can be a powerful policy approach as it creates demand for more environmentally

advantageous options in public purchases, thus creating a pull effect in the market by scaling-up relevant business operations

(Renda et al., 2012). The findings are summarized in Tables 1 and 2.

<b>Core aim</b>	<b>Existing policy measures</b>	<b>General policy recommendations for product life extension</b>	<b>Recommendations to address product life extension in non-ownership models</b>
<b>Enable customers to extend product lifetimes by creating awareness of product lifetimes &amp; designing longer lasting phones</b>	<ul style="list-style-type: none"> <li>• Minimum legal guarantee: EU Consumer Sales Directive: 2 years; Sweden: 3 years; Norway: 5 years; Finland: expected lifetime</li> <li>• France: The Act (Law no. 2014-344) addresses durability and lifespan of consumer goods, including the introduction of extended product guarantees from 6 months to 2 years</li> </ul>	<ul style="list-style-type: none"> <li>• Enforce sellers to inform customers of their rights, labeling of warranty rights, and declaring expected lifespans</li> <li>• Create specific eco-design criteria for mobile phones</li> <li>• Ensure software support through minimum guarantee period</li> </ul>	<ul style="list-style-type: none"> <li>• GPP criteria requiring longer use of products for extended number of years (by product category, e.g. minimum 3 years for mobile phones)</li> <li>• Mandatory priority of software upgrade over hardware upgrade</li> </ul>
<b>Enable widespread reuse &amp; increase consumer confidence in second-hand products</b>		<ul style="list-style-type: none"> <li>• Adopt refurbishment certification standards</li> <li>• Quality labeling for re-used ICT equipment and re-sale opportunities</li> <li>• Non-destructive disassemblability of key components</li> <li>• Adjust WEEE schemes and lower VAT or tax breaks for repair/refurbished electronics</li> </ul>	<ul style="list-style-type: none"> <li>• National re-use targets, to enable a stable market for good quality second-hand products and increase sourcing from 'non-ownership' models</li> <li>• Re-use/recycling certificates – auditing, to ensure responsible treatment and re-use opportunities for EOL products</li> <li>• Data erasure protocols and commonly accepted methodology for protecting the privacy and confidentiality of customer data and enabling re-use of ICT equipment</li> <li>• EPR rules to recognize the need for retrieving functional spare parts from EOL products and redirecting them to repair services and second-hand markets</li> </ul>
<b>Increase availability of spare parts</b>	<ul style="list-style-type: none"> <li>• France: The Act (Law no. 2014-344) - obligation of retailers to inform customers about the time horizon that spare parts will remain available for a product</li> </ul>	<ul style="list-style-type: none"> <li>• Provide access to spare parts for expected lifetime</li> </ul>	<ul style="list-style-type: none"> <li>• EPR rules to recognize the need for retrieving functional spare parts from EOL products and redirecting them to repair services and second-hand markets</li> </ul>
<b>Address the variable quality and supply of phones coming back</b>		<ul style="list-style-type: none"> <li>• Information campaigns on the value of used electronics</li> <li>• Encourage leasing models (starting with public sector)</li> </ul>	<ul style="list-style-type: none"> <li>• Re-use/recycling certificates – auditing. Within this policy approach, there is a possibility for auditing each EOL batch and depending on age and quality it could be either redirected to re-use or recycling</li> <li>• Strategic use of GPP tenders to include more PSS requirements and provisions for extended use-phase of products purchased (with associated repair services)</li> </ul>

**Table 1. Existing and proposed policy measures related to product lifetimes of mobile phones.**

## Discussion & Recommendations

In terms of how existing and proposed policy measures address product life extension in the context of non-ownership models, it appears there are limited policies that target life extension when the shift of ownership changes from customer to company. In fact, non-ownership models could perhaps even provide a means for companies to protect themselves from proposed policies. For example, a product producer required to provide guarantees for five years could instead provide the product via a non-ownership model that upgrades the customer to a new product every two years, thus avoiding the minimum legal guarantees. This gap in policy could be addressed by taking a lifecycle perspective for non-ownership models. The authors propose some measures in the final columns of Tables 1 and 2, and conclude this paper by expanding on three proposed recommendations:

### *Service-Oriented GPP*

Currently, GPP criteria mainly focus on the use phase of the product throughout its life within the public organization; elements of resource efficiency in production and disposal after use are not entirely considered (Wasserbauer & Milios, 2019). Additionally, public sector requirements can also be in direct contradiction with product life extension as is now the situation for ICT equipment (e.g. laptops and mobile phones) upgrades in

Sweden where replacement happens in regular intervals, irrespective if the product is fully functional or damaged (Crafoord, Dalhammar, & Milios, 2018).

Furthering developing GPP criteria that take the product's entire lifecycle into account could help ensure a selection of non-ownership offerings that contribute to product life extension. New methodologies could be developed to calculate impacts in GPP, by using a mixed method of LCA and LCC and rating systems of IO-MFA (especially on critical raw materials and hazardous substances). Admittedly, this is an enormous task for public authorities to perform individually, so it is essential that a central authority with a strong mandate both from government and industry can liaise with scientific partners to develop such a methodology.

### *Mandatory national re-use target*

Currently, legislation provides only national targets for 'preparation for re-use and/or recycling' without making a distinction between the two operations. In fact, it is most common practice in EU Member States to calculate the target by measuring the amount of waste collected for recycling (not the actual amount being recycled) and excluding any operations related to re-use as these are particularly hard to measure (EEA, 2013).

Core aim	Existing policy measures	General policy recommendations for product life extension	Recommendations to address product life extension in non-ownership models
<b>Enable customers to extend product lifetimes by creating awareness of product lifetimes &amp; designing longer lasting furniture</b>	<ul style="list-style-type: none"> <li>• Minimum legal guarantee: 2 years for manufacturer or retailer warranty is implied under EU consumer law</li> <li>• Sweden: Eco-labels (i.e. Nordic Swan and Möbelfakta)</li> <li>• Sweden: National guidelines on GPP for furniture, developed by National Agency for Public Procurement (Upphandlingsmyndigheten)</li> </ul>	<ul style="list-style-type: none"> <li>• Longer mandatory warranty (i.e. 5 years) to encourage more durable furniture</li> <li>• EU wide Green Furniture Mark (GFM) and labeling of products based on eco-design requirements, GPP or EU Ecolabel</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce or substitute certain chemical additives (mainly flame retardants). This can extend furniture lifetimes by enabling multiple uses and enhancing indoor environment quality</li> <li>• Re-use/recycling certificates – auditing</li> <li>• National re-use targets</li> </ul>
<b>Encourage longer product lifetimes by incentivizing repair and reuse</b>	<ul style="list-style-type: none"> <li>• Sweden: Tax breaks for repairing household appliances at home, including furniture (the so-called 'rut-avdrag')</li> </ul>	<ul style="list-style-type: none"> <li>• Incentivize product return (i.e. vouchers by firms (e.g. IKEA) encourage customers to return furniture after use)</li> <li>• Utilize modular design principles to enable better repair and component replacement</li> </ul>	<ul style="list-style-type: none"> <li>• Mandatory partnership of OEMs with re-use sector</li> </ul>

Table 2. Existing and proposed policy measures related to product lifetimes of office furniture.

Setting a separate and well-defined target for re-use could be considered an institutional reinforcement for re-use in non-ownership models as it does not preclude that product producers would not already re-use their products without the target. Instead, firms operating non-ownership models would find themselves in an advantageous position to redirect their products to re-use, since there would be a guaranteed demand and probably reasonable monetary compensation. Furthermore, a separate target for re-use would send a clear message to the market and related stakeholders that there will be a new stream of resources available that needs to be re-used (which would otherwise end-up in recycling).

#### *Re-use or recycling certificates / auditing*

Currently, re-using and/or recycling of products in non-ownership business offerings are not regulated by any means other than internal company policies. Following in the steps of supply-chain auditing and certification schemes, there could be additional controls by independent authorities to prove (and measure) the flows of EOL products. Voluntary certification could be used as a business advantage by firms to engage with customers or even address new GPP criteria as proposed in the previous section.

On the other hand, the authorities could require mandatory certificates for all EOL units. A predetermined list of EOL treatment options and recognized EOL operators could be approved by a specialized public agency (e.g. EPA) and yearly auditing concerning all firms offering non-ownership solutions could be mandated by the agency. Although such a practice might increase the overall administrative costs, it would also enhance the transparency and accountability of EOL products both domestically and abroad. Taking into account that disposal and recycling operations (waste) are more costly and administratively demanding, the re-use option might seem as the preferable option for firms who ultimately look for profit (or at least reduced costs). This could lead to lower costs and increased resource efficiency for product producers and provide a stable stream of good quality second-hand equipment to the re-use market in EU Member States.

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