

Circular Business Models Enabled Through Modular Product Design

Briefing Paper 3 (23.04.2021)

Innovation Network aiming at Sustainable Smartphones (INaS)

Centre for Sustainability Management, DE & Institute for Integrated Quality Design, AT*

Towards Circular Business Models

A **business model** (BM) can be understood as “the rationale of how an organization creates, delivers and captures value” [1]. BM visualizations represent complex economic interdependencies in simplified models, e.g. in a ‘business model canvas’ or ‘value network’. The formulation of a BM concept can also serve as a communicational tool between management and operational activities. Four basic building blocks distinguish each business model: value proposition, value creation, value capture, and value delivery.

In the **circular economy** context, extended BMs are necessary to capture **additional value** that can be gained from a product by enhancing its active lifetime and the lifetime of the resources through product circularity strategies (i.e., reuse, repair, refurbish, recycle) [2]. In **circular business models** (CBMs), additional actors become relevant who take over circular service activities and capture related value. The ‘value network’ tool helps to visualize these **additional interdependencies** and to align the focal firm’s CBM with other stakeholders along the product lifecycle [3]. Thereby, it aims to transform value chains into (service) ecosystems. In general, the related **circular value creation architectures** can be centrally organized through strong vertical integration or strategic partnerships or evolve rather uncoordinated with autonomously operating actors [4].

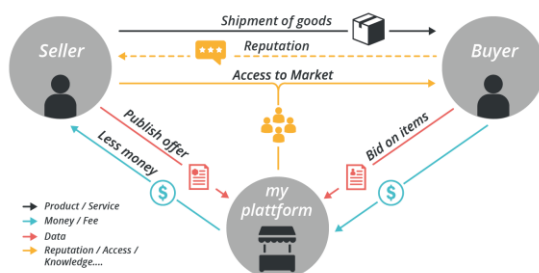


Figure 1: Exemplary Value Network (Business Model Toolbox) [3]

CBMs and Modularity

Modular product design (MPD) aims to facilitate various circularity strategies (i.e., repair, recycling, and upgrades) and thus increases circularity and sustainability potentials. Through easy accessibility and interchangeability of independent components, MPD can help to enable **circular product and material flows**, as well as promote related circular service operations [5]. Different possibilities for CBMs, interwoven with MPD, can be identified in the smartphone industry. In order to achieve the overall goal of circularity, circular product design and CBM strategies, should be jointly implemented [6]. Furthermore, MPD not only enables product lifetime extension but also **continuous innovation** in volatile markets with a high innovative competition in technology and design through, e.g., upgradability [7].

CBM and Modularity Applied

Everphone GmbH is a best-practice example for applying circularity and modularity in their BM. ‘Phone as a Service’ offers B2B-customers service options and smartphone rentals for their employees. Due to Everphone’s vertically integrated structure, the customer receives **everything from one provider** – from mobile contract to repair service. Used mobile phones from companies, employees, or Everphone itself can be refurbished and reused within the cascading cycle. Materials and resources will be recycled if smartphone refurbishing is no longer feasible.

Conclusion

CBM’s aim to support the **extension of product, material, and resource lifetimes**, and thus contribute to a CE. An **actor perspective** in value networks is essential. **Modularity** in product design can play an important role in CBMs and related services by facilitating re-usage, repair, and continuous innovation.

Innovationsverbund Nachhaltige Smartphones (INaS)

In the INaS, actors from business, science, and society **jointly develop sustainable business models** for **circular electronics**. Founded in 2016, it currently comprises approx. 30 **member firms**. Participating actors from industry meet regularly (every 6 months) in workshop settings to step out of their operational activities and give their creativity free space in order to identify and develop **economically viable solutions** for modular product designs.

We build on current research on the **Circular Economy** as a concept and solution approach. We thus include both slowing loops, such as maintenance, repair, second use phases, as well as closing loops through recycling. To sensitize member firms to the fact that the Circular Economy is more than just recycling of materials, is an important part of the INaS. We promote this rethinking by creating a space for cross-company and cross-actor cooperation. We use the concept of a "Living Lab" to create a systematic intervention and common innovation space for the participating actors.

The project is carried out at the Centre for Sustainability Management (CSM) at the Leuphana University Lüneburg under the academic direction of **Prof. Dr. Stefan Schaltegger** and **Prof. Dr. Erik G. Hansen** (Johannes Kepler University, Linz) as part of the joint project "Product Circularity through Modular Design - Strategies for Long-Lasting Smartphones" (MoDeSt). Other partners in the MoDeSt project are the Fraunhofer IZM, TU Berlin, Shift GmbH, and AfB gGmbH. The Institute for Integrated Quality Design (IQD) at the Johannes Kepler University Linz is an associated partner.

For further information please refer to our website:

<https://www.leuphana.de/en/institutes/centre-for-sustainability-management-csm/research-projects/inas.html>

References

- [1] Osterwalder, A., & Pigneur, Y. (2010). *Business Model Generation*. Hoboken, NJ: John Wiley & Sons, Inc.
- [2] Bocken, N., de Pauw, I., Bakker, C., & van der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, 33(5), 308–320.
- [3] Business Model Toolbox (2021). Value Network approach. Available online: <https://bmttoolbox.net/> Access: 06.04.2021
- [4] Hansen, E. G., & Revellio, F. (2020). Circular Value Creation Architectures: Make, ally, buy, or laissez-faire. *Journal of Industrial Ecology*, 24(6), 1250-1273.
- [5] Agrawal, V. V., & Ülkü, S. (2013). The role of modular upgradability as a green design strategy. *Manufacturing and Service Operations Management*, 15(4), 640–648.
- [6] Bakker, C., Wang, F., Huisman, J., & Den Hollander, M. (2014). Products that go round: Exploring product life extension through design. *Journal of Cleaner Production*, 69, 10–16.
- [7] Aversa, P., Haefliger, S., Rossi, A., & Baden-Fuller, C. (2015). From business model to business modelling: Modularity and manipulation. *Advances in Strategic Management*, 33, 151–185.

*Authored by: Clara Amend (CSM), Ferdinand Revellio (CSM & IQD), and Lea-Carlotta Krafft (CSM)