

New Service Opportunities through Sustainable Modular Product Design

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Innovation Network aiming at Sustainable Smartphones (INaS)

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From Products to Services

In the dominant business logic, firms are primarily focused on selling new products instead of maintaining existing ones in the field. This results in **shorter product lifetimes** and more waste due to a multitude of effects.

The concept of a **circular economy** aims to shift production and consumption from this linear model to one with repeated revenues and increased resource productivity [1]. Key practices include repair, reuse, and remanufacturing. An integral part of circular value creation represents the provision of **complementary services** for these practices.

These services help to meet unique customer needs over an extended time period, keep products in-use, and may also create additional competitive advantage. Consequently, this leads to an appreciation of the **economic value of products and components** and promotes a shift from **ownership to access** of products.

Product-Service Systems (PSS) and Modularity

Complementary service offerings are essential to fully maintain circularity and extend the overall lifetime of a product. A repair-friendly design without the necessary repair infrastructure may miss its sustainability aspiration. To fully link circular products and services, new business models emerge [2], based on **product-service systems**.

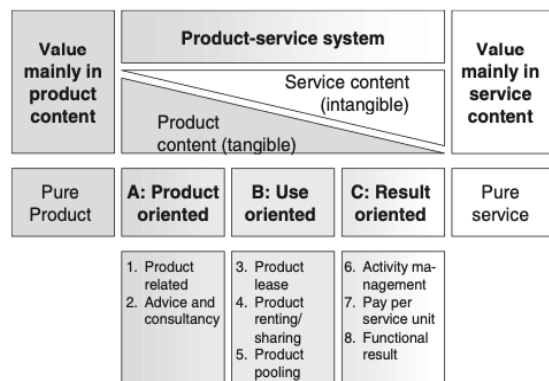


Figure 1: PSS types overview [3]

PSS characteristics differ based on the degree of service integration: from **product oriented** to **use oriented** and finally **result oriented** offerings (see Figure 1). Each of them may help to fulfil specific customer needs and has the potential to adapt quickly to innovative markets. PSS providers capitalize on adapted product designs to efficiently offer their services, e.g. upgrading to the newest functionality [4]. **Modularity is one example of a design principle** that facilitates circularity of products and parts due to its adaptive capacity. Sustainability-focused modularity supports multiple and extended use times, which creates additional value for actors along the entire value cycle. This makes a PSS more effective and cost-efficient.

Example: Gerrard Street headphones

The Dutch company **Gerrard Street** offers access to high-quality headphones with replacements and upgrades for a **monthly subscription fee**. They take advantage of their modular design with standardized components and simple (dis)assembly without glue to repair components and add customized modules.



Figure 2: Gerrard Street headphone components [5]

Conclusion

Circular **product and service designs** go hand in hand. Complementary service offerings are an essential part of circular value creation to actually keep products, parts, and materials in the loop. **Sustainable modular product design** is a useful design principle to unlock efficiencies in the service-focused operations of the future. Key is to link both in a vivid business model.

Innovationsverbund Nachhaltige Smartphones (INaS)

In the INaS actors from business, science, and society **jointly develop sustainable business models** for **circular electronics**. It was founded in 2016 and has currently approx. **25 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.

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For further information please refer to our website:

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

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